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Research Possibilities in the Laboratory Organization—III

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This is the third of a series of four articles on industrial-arts research.

The industrial-arts laboratory, in all of its aspects, is still a virgin field for the research worker, though general recognition of its educational value is causing more and more attention to be given to the development of adequate criteria for its organization. Rooms of any size and shape, and located in odd parts of the building or basement will no longer suffice.

When one talks of a new development, the first question to arise is, "How much will it cost?" Costs have usually been thought of from the angle of immediate outlay only. The emphasis on the dollars and cents needed overshadows consideration of the returns from the investment. Recognizing that the law of diminishing returns holds in shop planning, as for other expenditures, what attempts have there been to evaluate the incomes from educational investments? Researches are needed to set up criteria for the proper outlay in buildings, equipment, maintenance, and personnel. Such studies will not only justify expenditures, but will show what is adequate for various situations.

One cannot begin to plan a laboratory without having in mind objectives in terms of courses or curriculum offerings which he intends to provide. Studies in professional ancestry narrow these down for the public school to those activities which most nearly satisfy in the preparation for complete living. The teachers' college on the other hand must have such physical facilities and curriculums as will enable prospective teachers to meet the demands of the public-school situation. Thus, one sees two types of researches dealing with curriculums. The suggestions of Bonser and Russell, of Teachers College, Columbia University, were guideposts early in the present century for school officials who were interested in formulating suitable outlines for industrial-arts procedures. A notable example is the Hammond, Indiana, Survey of 1915.[1] Nearly a quarter of a century ago, this school system was already urging that laboratories be set up on a different basis than before and that at least the following areas of work be advocated: Drafting, woods, metals, electricity, concrete, painting, and finishing. This suggests possibilities for interesting historical developments relating to the laboratory.

One cannot go far with studies on the curriculum without coming in contact with other areas for research such as, "Teacher education," and "Devices for teaching." Since these are given consideration in a succeeding article, further space will not be accorded them here.

Additional possibilities in historical studies are seen in the evolution of tools used in the school shop. This is apparent when one looks at the "Treatise on Mechanical Exercises" by Joseph Moxon,[2] and compares his description of seventeenth-century developments with those of today. The coming of the portable-type machine since the word war furnishes material for several interesting studies. The tendency to develop lighter and less expensive apparatus, and the efforts along this line made by teachers in various parts of the country, furnish subjects for other interesting reports. A notable attempt of recent date was that of Jackson at Indiana University.[3] This study illustrates possibilities in assembling homemade portable-type machines from discarded apparatus. Many manufacturers of production equipment for wood and metal products are now paying considerable attention to the development of portable equipment. Researches are being carried on by them to determine what type of equipment will be most likely sought by educational institutions as well as for production purposes.[4] Similar studies need to be undertaken by teachers themselves who are closer to the needs of boys and girls.

What has been said regarding the possibilities for researches relative to machine equipment applies equally well to other equipment in the school laboratory. The following should furnish topics for many useful studies:

1. Workbenches: Types of, location, size, general utility, and durability.
2. Storage cabinets: Types, sizes, location, general utility, durability, convenience of use, and finish.
3. Hand tools: Researches regarding them have already been suggested in papers on "Devices."
4. Office furniture: Amount, kind, adaptability, durability, utility, and finish.
5. Janitor's equipment and supplies: Location, and suitability.
6. Chairs, stools, benches, and other types of seats used in school laboratories.
7. Drafting tables, type stands, and other special bench equipment.

Warner, of Ohio State University,[5] has called attention to the need for study relative to "Physical Planning" in recent articles. This may include built-in features in the laboratory such as wall cabinets for keys, tools, etc. Cases for perpetual exhibits of students' work or the displays of manufacturers probably should come under this classification as well.[6] Here, too, might be listed such studies as deal with the location of bulletin boards, and other wall apparatus, electrical outlets and switches, fire extinguishers, and first-aid cabinets. Equally important in this connection are studies on plumbing, heating, ventilating (including dust collecting), and floor and ceiling outlets for power and light. Allied with each of these is the need for criteria relative to the location, type, costs, maintenance, and general efficiency of such accessories as: Toilets, lavatories, drinking fountains, fire hose, lights, radiators, motors, fans, flues, bells, telephones, gas appliances, air apparatus, drains, exhaust

[1] Leonard, Robert J., *Some Facts Concerning the People, Industries, and Schools of Hammond*, Hammond, Indiana. Board of Education, March, 1915, 165 p.

[2] Bennett, Charles A., *History of Manual and Industrial Education up to 1870*, Peoria, Illinois. The Manual Arts Press, 461 p. See page 51.

[3] Jackson, Harry R., *A Study of Homemade Machines for Purposes of Equipping the Small School Shop*, Bloomington, Indiana. Indiana University, 1935, 107 p.

[4] The Yates American Woodworking Machine Company of Beloit, Wisconsin, undertook such a study in connection with its 1935 line of portable machines.

[5] Warner, William E., "Establishing the General Shop," Part I, II, III, IV, Industrial Arts and Vocational Education. August, September, October, and November, 1930.

[6] Warner, William E., et al, *General Shop Possibilities:* A Symposium written by University Students in Description of an Exhibit of General-Shop Work shown at the Ohio State Fair in 1929. (Suggests the matter of exhibits.) (Out of print.)

ducts, wall and floor ventilators, radio broadcast and receiving, and general machine equipment.

While considerable work has already been done relative to the administration of industrial-arts laboratories,[7] such efforts are but steppingstones which show the need for continuing studies in order that the work of the school can keep pace with trends in the social order. The question of *method* will always invite study because of the variety of activities and conditions to be met. If there can be set up some definite procedures for beginning work in the general shop, what a boon such services can be to new teachers. Obviously the *first* day is of greater importance than any other in creating the proper atmosphere and getting off to a start that will undoubtedly mean everything for the outcome of the course. The conducting and reporting of experiments in *the beginning of work* in the various areas challenges the research worker. The perfecting of teacher and pupil personnel[8] in the general organization[9] has already been the subject of several writers on administration.[10] Yet there is need for much actual experimenting in the laboratory situation, and the publishing of results so that the information may save untold time and effort for others.

Such experiments will necessarily involve teacher and pupil duties and administrative stations pertaining to each. The teacher's station may be thought of as his office. Very little has been done relative to determining how the location, arrangement, and equipment of the teacher's office can expedite teaching and learning in the shop. Surely there is need here for investigation if this administrative area functions other than as a private retreat.

Should the office be, among other things, the location for reference books which the pupil will use? Some advocate that there be a separate reading room where the pupil can feel more at ease in the selection and reading of reference material. Others feel that such materials should be kept in the general school library. While many disadvantages are apparent in the latter plan, criteria need to be developed which will show the most effective arrangement, and the kind of reading materials to supply.

A difficult and embarrassing problem confronting the teacher of industrial arts is the matter of outside demands on his time and that of his pupils. While this antedates *manual-training* days, the writer knows of but one attempt to bring the matter into the open with some convincing statistics.[11] Since this study is now quite old, similar ones need to be made on state-wide bases in order that state and federal pronouncements can contain criteria for removing this handicap to pupil progress.

Attention must also be given to the development of criteria not only for determining what activities shall be carried on in the laboratory, but also to show how these areas can be located with respect to each other for the most effective handling of materials, dispensing of supplies, and for carrying on the activities themselves. Studies showing how shop activities may be used as integrating factors, correlating, and creating needs for what were formal academic areas can be of much significance in general education. The *planning area* is one of first importance in this connection, as well as for the immediate activity of the pupil. There is then need for a number of experiments with it in order that it can be of maximum usefulness.

The industrial-arts *schedule* needs to be worked over constantly and studies backed up by experiments or other authority are needed to show such things as: Time of day most suitable for various activities; proper length of class period; and kinds of activities most suitable for different ages or maturity levels. There is need in this connection for further study on the teaching load in hours per day and pupils per class.

Problems regarding safety and health have had the attention of writers on general administration of the laboratory, as have also such matters as storage of supplies, projects and tools. Devices in the nature of *record forms* have been set up to facilitate caring for these problems.[12] Yet, there is need for further co-ordination of this material and the setting up of more definite policies.

Further thought can be profitably given to the toolroom in any laboratory situation. Obviously it should not be a place where one needs to hunt for things that he may need, nor should it be a place for housing things which are seldom used. Here, again, a scientific study can do much toward making it an orderly and efficient part of the laboratory instead of simply an adjunct, as is too often the case.

An educational device used for centuries, but which has for the most part been sadly neglected, is the class excursion or trip. The organization of the trip, planning, transportation and control of the pupils to and from the place to be visited, planning what to see, and how to emphasize for the pupils what they should get from the visit, are all matters for considerable study and experiment.

Where to keep, and how to care for the work of the pupil, both while it is in progress and after it is finished, so long as it remains in the laboratory is another large problem for the teacher or administrator. This is a matter which probably should be thought of in connection with *physical planning*. However, some time should be taken to set up criteria for this phase of the organization of the laboratory. The small-school situation as well as the city shop should have attention in this respect.

The industrial-arts laboratory cannot be completely satisfactory if there is lacking a usable system for recording the dispensing of supplies and establishing a daily balance. There are many inventory systems which are partially successful and one recent research has given some attention to this as a matter of organization.[13] If the shop is not to be branded as wasteful, something more must be done about the matter of a daily inventory. Researches are needed to establish adequate systems which can be used effectively in various types of laboratories the country over.

During vacation periods, there is the problem of whether or not the shop can be used by others than the regular student group or by the school board for the benefit of the school system. If it does not seem feasible to have the shop used during vacations of long duration, then there is the problem of properly closing the shop so that supplies and equipment will not deteriorate.

While it has been shown that researches dealing with the industrial-arts laboratory can be thus distinctively grouped, it is clear from the foregoing that they cut across practically all problems in this field of education. However, it has seemed fitting for this paper to point out those research possibilities as pertaining more especially to the laboratory organization, and which may be recognized as falling into the following groups for classification purposes: Costs, curriculum, curriculum devices, display, equipment developments, exhibits, first day, home-workshop developments, interdepartmental relationships, inventories, library, lighting, machine equipment, maintenance, office, outside demands, personnel, planning area, records, safety and health, schedules, storage, supplies, tools, toolroom, trips, vacation periods, work in progress, and work on the job. The possibilities for research which have been indicated throughout this paper in each of these areas should be a continuous challenge to the student, and should result in valuable criteria for future procedures.

[7]Ashley, Lawrence F., "Plan for Maintenance of Shop Equipment," INDUSTRIAL EDUCATION MAGAZINE, April, 1933.

[8]Warner, William E., et al, *Organizing Pupil Personnel in the Laboratory of Industries*, Columbus, Ohio. Ohio State University, 1930, 53 p.

[9]Ashley Lawrence F., "Modern School Supervision," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, October, 1935.

[10]Smith, Homer J., *Industrial Education*, New York. The Century Company, 1927, 334 p. See especially Chapter IV on "Administrative Duties."

[11]Ashley, Lawrence F., "Manual Arts in Illinois." *The Manual Training Magazine*, July, 1921, No. 1, p. 1.

[12]Ashley, Lawrence F., "Organization and Administration of Shop Record Forms." *Western Arts Association Bulletin*. December, 1933, p. 180.

[13]Ashley, Lawrence F., *Administrative Problems in Industrial Arts Organization*, Columbus, Ohio. Ohio State University. Master's Thesis, 1933, 260 p. (Contains samples of inventories.)

Maladjustment and Learning in Relation to Interest

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The value of interest in learning receives scant attention by many educators. A study to evaluate it, therefore, ought to be of great interest to those intrusted with the education of our youth.

Is lack of interest in schoolwork a symptom of maladjustment? Do pupils learn more when their interest is high and less when it is low? Simple observation shows that for the very young child, a learning situation is a play situation; consequently, for many years, teachers have been instructed to make schoolwork interesting. Yet, many pupils not only say they dislike school, but they drop out at the earliest opportunity. The whole movement for reform, in West Allis and other schools of today, is based on the assumption that interest causes learning, and that dislike for school (presumably a learning situation) is symptomatic of a profound maladjustment on the part either of the pupil or of the school.

Three years ago the West Allis Public Schools joined forces with this movement for reform in education. Shortly thereafter, certain data were gathered for the purpose of testing the assumptions underlying the changed program. A study previous to the present one indicated that no significant relationship exists between interest and learning.[1] This conclusion is so at variance with present-day thought that the study was continued — largely for the purpose of checking the procedures employed. The able assistance of NYA workers made this possible.

In the previous study the size of the pupil's technical vocabulary in a certain subject was used as a measure of the amount of learning he had acquired. Since vocabulary is commonly found to be the best of any single measure of intelligence, one might with good reason suspect vocabulary growth not to be susceptible to teacher influence. This is the first point to be treated in the present study.

The specific question to be answered is whether vocabulary growth during a semester, in a given pupil group, is greater in a subject that is studied than in one not studied. Vocabulary growth, in the present investigation, is the difference between score on a vocabulary test given near the beginning of the semester (March) and again at the end (June).

The pupils involved, eighth-grade boys in one of the West Allis junior high schools, studied printing but not music that semester. Results of the study, given in Table I, show that vocabulary growth in printing (a subject that pupils studied) was about twelve ($7.67 \div .65 = 11.8$) times its probable error, while in music (a subject pupils did not study), the growth was only about three ($1.31 \div .39 = 3.3$) times its probable error. The conclusion is inescapable; vocabulary growth is very susceptible to school or teacher influence, notwithstanding that a vocabulary test is the best single measure of intelligence.

The point that vocabulary and intelligence are highly correlated, merits further attention, however, in this connection. Table II shows the correlation (1) between I.Q. and printing vocabulary growth, and (2) between I.Q. and music vocabulary growth. Note that the correlations reported are not between I.Q. and vocabulary at the end of the semester, but between I.Q. and vocabulary growth during the semester. The correlation is not high in either case; but it is about three times its probable error in the case of printing, the subject studied, and smaller than its probable error in the case of music, the subject not studied. This means that the I.Q. operates to produce vocabulary growth in a learning situation, but is inoperative in a nonlearning situation.

Does interest also operate to produce vocabulary growth? If so, which is the more significant — interest at the beginning of the semester or at the end? The correlations in Table III show that neither is significant. The third correlation, however, suggests that vocabulary growth is related to a change of interest. The relationship is not high except in comparison with the correlations between I.Q. and vocabulary growth given in Table II. Such

Subject	No. of cases	March		June		Cor. coef.	Difference * D ± P.E.
		Mean	σ distb.	Mean	σ distb.		
Printing	71	28.70	6.94	36.37	7.87	.399	7.67 ±.65
Music	74	20.15	4.52	21.46	4.80	.437	1.31 ±.39

Table I. Statistical constants pertaining to vocabulary growth in printing and in music.

**The probable error of the difference between means was estimated from the formula:*

$$\sigma_{M_1-M_2} = \sqrt{\frac{\sigma_1^2}{N} + \frac{\sigma_2^2}{N} - \frac{2r_{12}\sigma_1\sigma_2}{N}}$$

Subject	No. of cases	Cor. coef.	PE$_r$
Printing	69	.244	.076
Music	71	.062	.080

Table II. The correlation between I.Q. and vocabulary growth in each of two subjects: Printing and music

Variables	No. of cases	Cor. coef.
Beginning interest vs. vocabulary growth	68	--.142
End-of-semester interest vs. vocabulary growth	68	.085
Increase of interest vs. vocabulary growth	66	.450

Table III. The correlation between interest and growth in printing vocabulary

[1]Gilbert L. Betts and Roy R. Van Duzee. "Interest and Learning," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, pp. 135–36, May, 1936.

comparison shows that progress in a subject is much more closely related to a change of attitude toward it than to I.Q.

Further consideration shows that the correlation of .45 between vocabulary growth and a change of attitude may perhaps be more significant than its size indicates. The correlation may be small not so much because a close relationship is lacking as because the two measures are unreliable. Table IV contains the data needed to correct this coefficient for attenuation.[2] When this correction is made, the true relationship between vocabulary growth and a change of attitude appears to be in the neighborhood of .70 instead of .45. This indicates that a 50-per-cent community exists between the two.

A change of interest thus appears highly significant in relation to school success. It becomes important, therefore, to know whether our schools maintain pupil interest from year to year, and what happens if they do not. This, too, was studied.

At the time the foregoing measures of attitude of the entire junior- and senior-high-school population in West Allis was determined. This was done by means of a modified form of a generalized attitude scale constructed by Ella B. Silance and H. H. Remmers, and distributed at one of the meetings of the American Educational Research Association in Cleveland in 1934.[3] Shortly after the opening of the second semester (in February, 1935), pupils in West Allis listed on this scale all the subjects they studied during the previous semester and reacted to each as directed. This yielded a measure of the attitude of each pupil toward each subject.

These attitude scores (15,423 from 2,542 pupils, or about 6 per pupil) were arranged into frequency distributions, one for each grade from seven through twelve. All of these distributions were skewed toward the lower end of the scale. The proportion of cases in the tail seemed to vary with each succeeding grade, although the mode remained approximately constant. The scale is so arranged that a score larger than 21 indicates liking for a subject, and less than this indicates dislike. Accordingly, the proportion of cases in each grade that disliked specified subjects was found. This is given in Table V. The amount of dislike for schoolwork increased steadily through the junior-high-school grades, dropped sharply in the first year of senior high school, and declined regularly thereafter.

The meaning of this is not clear until the enrollment in each grade is also examined. The sharp increase in 9th-grade enrollment is due to the entry of private- and parochial-school pupils into the public schools. The amount of dislike for schoolwork does not, like the enrollment, remain almost constant in grades 7 and 8, and then increase sharply in the 9th grade. On the other hand, the amount of dislike does follow the steady decline in enrollment through the senior-high-school years. Not only is the enrollment in the 12th grade less than half of that in the 9th grade, but the amount of dislike is likewise less than half. The most plausible explanation of this whole situation seems to be this: The amount of dislike for schoolwork increases regularly from year to year during the compulsory full-time school-attendance ages, and decreases thereafter because pupils who dislike school drop out.

Summarizing, one can say that a pupil's attitude toward schoolwork, when changing for the better, has a greater influence upon achievement than has I.Q. Unfortunately, dislike for school seemed to increase steadily and reach a climax in the ninth grade. The grade-by-grade enrollment, thereafter, indicates that less than half the ninth-grade pupils will reach the twelfth grade.

One is forced to conclude, therefore, that maladjustment was deep and wide at the time these data were gathered. The change of emphasis from the traditional compulsion type of school in West Allis to a more alluring one, seems to have been timely indeed. Although this change is beset with many difficulties, and much remains to be done, it is heartening to know that its direction is right.

Description	Cor. coef.
Reliability of attitude score	.74
Correlation between attitude at beginning and end of semester	.40
Reliability of vocabulary score	.84
Correlation between vocabulary at beginning and end of semester	.40
Reliability of the attitude difference	.57
Reliability of the vocabulary difference	.73

Table IV. Correlation coefficients needed to calculate the reliability of the differences in attitude and vocabulary

Measure	Grade					
	7	8	9	10	11	12
Enrollment (June 1935)	597	604	773	653	415	384
Enrollment as per cent of 7th grade enrollment	100	101	130	109	70	64
Percentage dislike for schoolwork	15.5	17.4	18.7	9.6	8.6	7.1

Table V. Enrollment by grade and percentage dislike for schoolwork

[2]The usual correction formula $rdD = \frac{r_{11} + r_{22}}{2} - r_{12}$ was used. The formula for the reliability of a difference $\frac{}{1 - r_{12}}$ is given in J. Crosby Chapman, "The Unreliability of the Difference. . . ." *Journal of Educational Psychology*, 14:103–8, February, 1923.

[3]See H. H. Remmers, "A General Attitude Scaling Device." *Psychological Bulletin*, 30:719–20, 1933. The validity of this modified scale was reported in the work cited in footnote No. 1.

Electric-Motor Maintenance

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A practical job done in a practical way.

Most schools make use of a large number of electrical motors which need regular servicing. This servicing may be done by the electrical-shop students if the job is carefully planned. A maintenance job may well be used for educational purposes if time is allowed to permit the student to understand the job he is doing. By servicing machinery regularly and frequently, many troubles which would ordinarily result in breakdowns may be corrected. Even repair jobs, if they do not disrupt the ordinary shop procedure too much, can be made educational projects, and, as such, can be handled efficiently.

In order to take advantage of the experience offered to the shop boys by these servicing jobs, a group of four boys was delegated to make a survey of the elec-

trical equipment. The boys worked in pairs, one reading the name-plate data on the motor and the other recording it. The location of each motor also was recorded. All of this data was then transferred to blanks, and bound in a loose-leaf binder for handy reference.

It was found that there were approximately one hundred motors which needed servicing. A routine schedule was put into effect so that each motor would be serviced about once a month. This means that each boy in the shop services each motor at least once. The experiences encountered are, of course, varied and practical. Two boys usually work together on the servicing job, the one having had less experience with the work acting as helper to the other. The two spend about a week checking all of the motors. All minor jobs such as oiling, cleaning, sanding, cleaning commutators and adjusting brushes are done immediately. Other jobs such as replacing bearings, changing and sanding in brushes, drying out coils, replacing contact fingers on starters, and rewinding field coils or armatures are done just as soon as the material can be obtained. All of the jobs last mentioned, except burned-out field coils and armatures can usually be foreseen and notations made on the service sheets so that the necessary material can be ordered before a breakdown results. This makes it possible to make repairs in a shorter time and perhaps at a time when the motor is not needed. An inspection of the sample service sheet will give a better idea of how the record on each motor is kept.

From an educational point of view it can readily be seen that there are many advantages in using this system of checking motors. The boy is given a responsibility which he rarely gets in the shop. He gets into the habit of going at a job in a systematic manner and learns that a record on paper is better than a haphazard mental note. He gets practical experience on the job rather than "exercise" experience on motors which are never used. He works under actual working conditions and learns by experience many of the things that may go wrong with a motor. He learns that it is better to prevent trouble than it is to correct it. He learns values by looking up prices and making out orders for repairs. He is given the opportunity to deal with the people who use the motors and in this way learns some of the difficulties encountered by the consumer when repair-work is to be done.

From a maintenance point of view the advantages are also numerous. Less money is needed for equipment in the electric shop. Motor repair bills are cut down because serious troubles are often prevented by making minor adjustments and necessary repairs on time. The name-plate data on all motors are available at one point. This permits checking of serial numbers when repairs are ordered and minimizes errors. Records of this kind kept over a long period of time will undoubtedly aid in determining what types and makes of motors are best for various applications. In short, the results are beneficial educationally and financially.

MOTOR SERVICE SHEET

Location.. Laundry Stretcher.....
Manufacturer's Address. Howard Electric Co.
Serial No. 134137A.. Model..78274.....
Frame....A-42..... Type...R.C.24....
H.P...2.. Volts...115.... Amps....16.6.....
Winding. Compound. Open Cont. 50° C. rise
Speed. 1700.... Phase..... Cycles. D.C..

Date Checked	Remarks
5-27-31	Cleaned brushes and Commutator
7-8-31	Checked - OK
9-24-32	Oiled and Checked - OK
1-3-33	Checked - Needs new brushes
4-18-33	Checked - New brushes installed
9-14-33	Checked - OK
10-11-33	Checked and Oiled

Sources of Occupational Information

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A helpful article for shop teachers on where to find suitable material for the vocational-guidance work with their students.

It is the purpose of this article to analyze the practical sources which may be utilized for the purpose of obtaining information about occupations. Too much reliance on any single source may result in either a distorted or an incomplete picture of actual conditions. This is particularly true when information is based on opinions rather than facts. Furthermore, there is danger that a certain reference may paint the picture in terms that are either too glowing or too hopeless. One source may outweigh advantages with disadvantages; another may reverse the process. They must be diversified to be adequate.

Four quite definite and distinct sources may be used for the purpose of finding out pertinent information about occupations.

Printed Material

For reading purposes, they fall into five categories. The first of these is the general book on occupations. Books of this type are often used in occupations classes as textbooks. They are usually designed to be comprehensive in scope in that they present an overview of the entire world of work. Of course, there is no textbook in the field that is all-embracing for the simple reason that the number of occupations is too great to be treated with any degree of adequacy. The best that any comprehensive textbook in occupations can do is to provide a general survey of work-life, analyzing in detail the most important occupations only. These books are valuable for the purpose of surveying the whole field; they hardly suffice for detailed analytical purposes. *Occupations,*[1] by John Brewer; *Planning a Career,*[2] by Smith and Blough; and *Planning Your Future,*[3] by Myers, Little, and Robinson are examples of this type.

A second type of reading material is the book, pamphlet, or monograph which analyzes one occupation or a selected group of occupations. It is reasonable to suppose that the authors of this kind of occupational literature are most intimately acquainted with the occupations about which they write; their treatment of the subject is intensive rather than extensive. Hence, the chances are probably greater that such information will have more validity. Sometimes this source of reading exists in a series of pamphlets, each of them concerned with an occupation written by a research specialist. Sometimes a book of this type is restricted to certain occupations. *My Life Work,*[4] by Cooley, Rodgers, and Belman; *An Outline of Careers,*[5] by E. L. Bernays; and *Careers for Women,*[6] by

[1]Ginn and Co., 1936, 15 Ashburton Place, Boston, Mass.
[2]American Book Co., 1929, 88 Lexington Ave., New York City.
[3]McGraw-Hill Book Co., 1930, 330 West 42nd St., New York City.
[4]McGraw-Hill Book Co., 1930, 330 West 42 St., New York City.
[5]Doubleday, Doran & Co., Inc., 1927, Garden City, N. Y.
[6]Houghton-Mifflin Co., 1934, 2-4 Park Street, Boston, Mass.

Catherine Filene illustrate this type of reading in book form. *Careers,* by the Institute of Research; the *Commonwealth Vocational-Guidance Monographs,* by the Commonwealth Book Company; and *Guidance Leaflets,* by the Office of Education are published in pamphlet form.

Another kind of occupational literature is published by occupational and institutional groups. *The Telephone in America,* by the American Telephone and Telegraph Company, for example, has some space devoted to training operators. The *Why and How of Apprenticeship* by the National Metal Trades Association (Milwaukee Branch), contains pertinent information on apprentice training for the metal trades. Various catalogs outlining training schedules published by schools, colleges, and universities also serve to illustrate the type.

Current material is another important source. Articles of an occupational nature can be found in most newspapers and magazines. For instance, a recent daily newspaper contained an article on the field of aviation. It is surprising the amount of material which can be gathered from similar reports. The magazines which specialize in guidance literature, such as *Occupations,* the National Vocational Guidance magazine, published excellent material from every standpoint. The *Education Index* and *Occupational Index* list current articles under classified headings. Many trades, professions, businesses, or industrial divisions have their distinctive periodicals. They can be found in the *Directory of Newspapers and Periodicals* under the division Trade, Technical, and Class Publications.

Certain fact-finding agencies publish data. The most notable of these is the Bureau of the Census. *Population, Occupations by States,* Volume IV; *Classified Index of Occupations;* and *Statistical Abstract of the United States* are Bureau publications. The volumes of the several industries also contain related information.

The Interview Method

It is distinctly worth while for the investigator to talk to workers in the field. It is necessary to keep in mind that information secured in this way will be tempered by the peculiar experiences of the individuals interviewed. Hence, a variety of opinions, sometimes diametrically opposite, will result. Nevertheless, the interview is valuable. Personality of the worker may be studied at first hand. Some insight may be gained concerning occupational complexes which cannot be secured in any other way.

Placement officers and other guidance workers, too, are in an excellent position to give information. Dealing as they do with a constant stream of workers and prospective workers, they are properly fit to make comparisons of human abilities and occupational opportunities.

Observation

Visits to occupational establishments are invaluable aids. Here the investigator will find the worker in work surroundings. Permission from responsible authorities of such establishments should always be secured. Usually they are willing and eager to cooperate.

A few visual aids such as motion pictures and slides may be used effectively. Pictures from newspapers and magazines provide current sidelights on occupations. A file of such pictures is very helpful.

The Tryout

The use of the tryout is, of course, for the guided only. The most practical of the tryout procedures is actual job experience. In years past, youth had many opportunities to gain information through actual work experiences. By handling the tools and materials of the job and by associating with workers of a particular occupation, he was able to draw important conclusions concerning his fitness for the work. The apprenticeship system utilizes the values of the tryout although in many cases quite definite choices have already been made. An effective substitute for job experience is the school shop. Many schools allow students to pass through a series of general-shop tryouts in order to acquaint them with the tools and materials of the several occupations. The boy-scout merit awards idea by which awards are made in such fields as agriculture, architecture, art, aviation, beekeeping, and blacksmithing, to mention but a few, is an excellent means for the first-class scout to obtain a certain amount of information.

Bibliography

(The references listed are among the most recent and most valuable.)

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The Study of Printing Paper

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*A related-subjects lesson that is frequently overlooked in the school printshop.**

In a recent survey, printers stressed that the schools should teach printers' apprentices all there is to know about printing paper. It would be impossible for the schools to do this, of course, but according to the survey, it is possible to teach these learners quite a bit about paper. The author has, therefore, gathered for this article facts about paper that can be used in building a course of study on this obviously important subject in the graphic-arts schools.

Ingredients of Paper

Printing paper is made from grasses and fibrous plants, wood pulp, rags and cotton clippings, or a mixture of rags and wood pulp. The plants include esparto, straw, hemp, jute, and corn stalks. Hard woods used are poplar, gum, chestnut, aspen, basswood and birch. Soft woods used are pine, spruce, hemlock, balsam, and fir. Both cotton and linen furnish rag fibers.

To the basic ingredient of pulp from these plants, trees, and rags, are added lime, chalk, and clay. The paper is sized by adding rosin, glue, or starch. This adds strength, stiffness, and hardness, so that the sheets of paper will take ink and paste. A thin layer of clay mixed with casein glue is added in the manufacture of coated papers.

There is not sufficient space in this article to include a section on how paper is manufactured. If interested, the reader can look

*See also *Printing Papers,* Wheelright, The University of Chicago Press, Chicago, Ill.

up the March, 1935, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION for an article dealing with this subject.

Classification of Paper

The names of papers are often misleading to the printer and to the buyer of printing. One of the trade journals recently brought out the fact, for example, that *mill bristol* was a misnomer for the particular stock to which that name is applied. Mill bristol can be used for covers, envelopes, portfolios, postcards, and a multitude of other jobs. The name does not suggest this. The same is true of *offset book*. One would think, from the name, that this paper stock could only be used on offset lithographic presses, which is far from the truth.

Recently the paper mills have been trying to classify paper in grade of 1, 2, 3, and 4 for coated stocks, and a, b, c, d, and e for uncoated stocks. This classification is for the purpose of allowing the buyer some comparison of the papers made by the various mills, that are supposedly of the same grade.

Although not a complete classification, the following will suffice for this article:

1. Absorbent.
2. Boards.
3. Building.
4. Cardboards.
5. Cover.
6. News.
7. Printing.
8. Tissue.
9. Wrapping.
10. Writing.

Each paper named in the above classification is further divided into weights, sizings, and sizes. The table, "Classification of Paper," given in this article, presents the names, the special property of each kind, their uses, and usual sizes, and is sufficiently complete.

Teaching Paper Facts

Perhaps some enterprising paper merchant will some day make up a simple sample book of kinds, weights, and sizes of printing papers for instructional purposes. It would be a boon to the printing instructor and the related-subjects teacher if such a book were available. These merchants may say now that they spend thousands of dollars in issuing elaborate paper sample cabinets and books for the edification of printers. This is true, but a teacher cannot gather a group of 35 students about this sample cabinet, and let each one feel weights, note sizes, and distinguish kinds. Something much more simple could be brought out — a small book, for example, done inexpensively — so that these students, the buyers of printing of tomorrow, could see and handle papers at their own leisure.

Until this is done, the instructor should provide all sorts of paper samples for his pupils to study. These can be gathered from all the paper merchants in the immediate vicinity of the school plant, as catalogs and trade customs are often different in the various localities.

Figuring for Cutting Paper

For a small charge, per cut, the local paper houses will cut paper to size as wanted by the printer. This is especially helpful to the printer, or the school, with a 30-in. paper cutter on which the larger sizes such as 32 by 44 in. cannot be handled.

Before cutting paper, it is well to make sure that the stock is according to the specifications of the job at hand. Paper dealers will not usually take cut stock back for credit in case of error.

In figuring cover stock, one must make sure that folds will run with the grain of the paper. Often, if a heavy cover is figured for a fold across the grain, trouble develops in the binding, and a poor job results.

After the size of the printing job is determined, and before the paper is cut, one should figure the best size of stock to buy so there will be little waste. Very often the size of the stock will determine the size of the job, rather than the other way around.

Stock can be cut advantageously only by figuring the cuts both ways of the sheet. For example, on a job say 5 x 9 inches, to be cut from sheets 22½ x 28½ inches, the cuts can be figured two ways — but one way gives 10 pieces from the stock size; the other, 12 pieces:

$$\frac{5 \times 9}{22\frac{1}{2} \times 28\frac{1}{2}} = \frac{}{2 \times 5} = 10 \text{ pieces}$$

$$\frac{5 \times 9}{22\frac{1}{2} \times 28\frac{1}{2}} = \frac{}{4 \times 3} = 12 \text{ pieces}$$

Figure the waste, also, in cutting. For example, suppose the job is 8 x 12 inches, and it must be cut from the 32 x 44 inch size:

$$\frac{8 \times 12}{32 \times 44} = \frac{}{4 \times 3} = 12 \text{ pieces;}$$

Waste here is 8 x 32 inches, so, figuring this waste:

$$\frac{8 \times 12}{8 \times 32} = \frac{}{1 \times 2} = 2 \text{ pieces;}$$

Then, with 12 pieces from the sheet, and 2 pieces from the waste, 14 pieces 8 x 12 inches can be cut from one sheet 32 x 44 inches.

Figuring for Costs of Paper

Prices of paper vary in different localities, so any mention of prices here would be futile. Sizes and weights of paper are indicated usually in one of two ways. In the method that has been longest in use, the weight is given for a ream (500 sheets). Thus, 25 x 38 — 70 means that 500 sheets of 25 by 38-in. paper weighs 70 lb.

In the second method, the weight is given for 1,000 sheets, thus 25 x 38 — 140 (M). It is easy then to figure the cost of 1,000 sheets of paper. Merely multiply the weight per 1,000 sheets by the cost per pound. Thus, the cost of 1,000 sheets of paper 25 x 38 — 70, at 6 cents per pound is $2 \times 70 \times .06 = \$8.40$.

However, when more or less than 500 or 1,000 sheets is used, and this is usually the case, a different problem confronts the printer. Here is a simple formula for figuring the cost of such a job:

1. Double the weight of 500 sheets.
2. Multiply the weight of 1,000 sheets by the number of sheets needed for the job.
3. Multiply the answer thus obtained by the price per pound.
4. Point off five decimal places in the answer, and this figure is the cost.

EXAMPLE: 300 sheets are needed for the job, to be cut from 25 x 38 inch 70-pound book paper, the cost of which is eight cents a pound:
$2 \times 70 = 140$; $140 \times 300 = 42{,}000 \times 8$ cents $= 336{,}000$. Pointing off, we have \$3.36, the cost.

Figuring for Equal Weights

Very often one wants to buy a stock that is of the same basic weight as 25 x 38 — 140 (M), or a 70-pound stock, in a large size, possibly 32 x 44 inch. Some of the paper house catalogs tabulate this weight with the size; others do not. Therefore it is good to know how to figure the weight of larger or smaller sizes of paper.

In calculating the ream weight of any size sheets for a given basis, proceed as follows:

Find the area of the two sheets in inches: $25 \times 38 = 950$ square inches; $32 \times 44 = 1{,}408$ square inches. Now multiply the area of the ream of the unknown weight by the ream of the known weight: $1{,}408 \times 70 = 98{,}560$. Dividing this product by the weight of the given ream: $98{,}560 \div 950 = 104.8$, and for easy figuring, call this 105 pounds.

Testing Paper

If the run of the grain of a paper is not known, cut off a square piece and bend it in one hand between the fingers and thumb, both ways — the short and the long way of the large sheet. It folds easier with the grain than against the grain. There is no set rule how the grain of a paper runs, as this is dependent upon the manner in which the paper is rolled at the paper mill.

Another test is by tearing the sheet, which tears easily with the grain, and harder against the grain. Still another way

is by wetting both sides of a piece torn from the sheet: the curl made as the paper dries will be across the grain.

In testing a paper for halftone printing, look at it through a strong glass. If the fibers are compact, the paper is good for this purpose. If a grainy surface shows, it is not good for halftones.

Good light reflection does not always mean that the paper is smooth and compact. Let the light strike the paper at a 45-deg. angle to the line of vision, and this throws into relief all surface irregularities.

The grain of a paper works best if it runs across the cylinder of the press. Also, in printing index cards that are to be used in a typewriter, the grain should run along the rubber roll.

Humidity and Paper

The curling, shrinking, and stretching of paper means grief to the pressman. These changes in the paper are due to its fibrous construction, and to the changes in the humidity of the room in which it is placed. If the stock curls around the felt side of the paper, the humidity is high; if it curls around the wire side, the humidity is low. Paper stocks of all kinds are usually made for a humidity of 50 per cent. A change from this will cause trouble in fine color printing.

Paper should be seasoned for at least 48 hours in the pressroom before it is used, so that it can become acclimated to the atmosphere of the pressroom. Much has been done by manufacturers of air-conditioning machines for the pressrooms to eliminate costly atmospheric changes in paper, which may ruin close register in color printing, as well as curl the sheets so that they are hard to run in the feeders of the presses.

Basis Weight

Up to a few years ago, the ream, or 500 sheets, was the basis of count and weight of printing papers. Now 1,000 sheets is the basis. However, when we speak of a 70-pound stock, we still mean that 500 sheets of the paper weigh 70 pounds. As designated today, the two forms are used. The first, 25 x 38 — 70 still means that 500 sheets of the 25 x 38 inch size weighs 70 pounds. Likewise, under the new basis system, 25 x 38 — 140 (M) means the same; i.e., that 1,000 sheets of the same weigh 140 pounds, or 500 sheets weigh 70 pounds. The capital M in parentheses notes that difference, meaning, of course, 1,000 sheets.

Suggestions for Study

The best help in the study of paper is the habit of consulting the paper sample cabinets and books, and the catalog of prices. The student should become familiar with the sections of the cabinet, which shows the various grades and makes of

Classification of Paper

Name	*Property*	*Use*	*Sizes*
Antique book	Bulky, rough	Books, programs, advertising	25 x 38 28 x 40 32 x 44 35 x 45 38 x 50
Blanks	Thick, smooth finish	Signs, etc.	22 x 28
Blotter	Absorbent one or both sides, plate, pasted, enameled	Advertising	19 x 24 24 x 38
Bond	Rough, no glare, takes writing ink	Stationery, office forms	17 x 22 19 x 24 22 x 34
Cardboard	Heavy, durable	Cards, signs, boxes	22 x 28 28 x 44 22½ x 28½
Cellophane	Transparent	Wrappers	
Coated book	Smooth, shiny	Halftone printing	25 x 38 28 x 44 35 x 45 32 x 44 38 x 50 26 x 40
Cover	Strong, easy folding	Announcements, booklets, catalogs, pamphlet covers	20 x 26 23 x 35 22½ x 28½
Eggshell book	Eggshell appearance	Books, booklets, programs, etc.	25 x 38 28 x 44 32 x 44 35 x 45
English finish	No glare, slightly roughened finish	Catalogs, booklets, magazines	25 x 38 28 x 42 35 x 45 28 x 44 32 x 44 38 x 50
Enameled	Shiny, smooth	Books and booklets with fine screened halftones; catalogs	25 x 38 35 x 45 28 x 44 38 x 50 29 x 52 32 x 44
Flats	Takes writing ink	Writing papers	17 x 22 17 x 28 22 x 34 19 x 24
Glassine	Transparent	Wrappers, covers	
Gummed	Gummed one side	Stickers, labels	17 x 22 20 x 25 22 x 34
Index Bristol	Writable qualities, thick	Filing cards, records	25½ x 30½
India	Thin, opaque	Bibles, encyclopedias	
Kraft	Tough, thin, usually brown	Wrapping paper	Rolls Flat 24 x 36
Ledgers	Take writing ink, strong	Blank books, office forms	16 x 21 17 x 22 18 x 23 19 x 24 21 x 32 22 x 34 23 x 26 24 x 38
Machine finish	Nonglare, smooth, book paper	Magazines, papers, advertising matter	25 x 38 32 x 44 28 x 40 38 x 50 35 x 45
Manifold	Thin, strong	Duplicate copies, sales books, etc.	17 x 22 19 x 24 17 x 28 28 x 34
Mimeograph	Roughened surface	Use in duplicating machines	17 x 22 17 x 28
Newsprint	Rough, quick drying of ink	Newspaper, handbills, posters	22 x 30 22 x 32 22 x 35 24 x 36 25 x 38 26 x 40 28 x 42 30 x 44 32 x 44
Offset	Roughened, heavy	Advertising, books, booklets, posters	25 x 38 35 x 45 28 x 42 32 x 44 35 x 45 38 x 50
Onionskin	Thin almost to transparency	Typewritten carbon copies, wrappers	17 x 22 17 x 26 19 x 24 17 x 28 28 x 34
Safety Paper	Designed to make forgery impossible	Checks, bonds, etc.	17 x 22 17 x 28 19 x 28
Supercalendered book	Smooth	Magazines and booklets	25 x 38 28 x 44 32 x 44 35 x 45 38 x 50
Tagboard	Tough, strong	Tags, etc.	24 x 36 22½ x 28½

paper and boards. The price catalog of the local paper dealer contains sections of an informatory nature other than prices and sizes. The student should read and learn portions of the following sections:

1. Terms of sale.
2. Cutting Section.
3. Color Charts.
4. Price Index.
5. Terms of sale and standards of weights and trade customs governing the sale of book papers, offset book, cover papers, writing papers, bonds, linens and ledgers, bristol boards, cardboard, tagboard, and blotting paper.

Paper Terms

Air Dried. Term applied to paper that is dried in a web running through a drying room.

Antique. Light, bulky paper with an uncalendered surface.

Basis Weight. Weight of paper in terms of a ream or of 1,000 sheets.

Beating. Preparing fibers of pulp for papermaking.

Binders Board. A heavy, stiff board used for book covers.

Blanks. Common white cardboard of low grade wood pulp.

Blotting. An unsized, absorbent paper or card.

Bogus Bristol. Imitation bristol cardboard.

Bond. A strong, rattly, translucent, hard-surfaced paper, used for office forms and the cheaper writing papers.

Book Paper. A class of paper used for books, catalogs, etc., like M. F., S. & S. C., antique, etc.

Bristol Board. A class of fine cardboard, usually having a smooth finish.

Broken Ream. Less than 500 sheets.

Calender Rolls. Rollers used in the papermaking machine for putting the finish on paper.

Casein Coating. A binder and adhesive for clay on coated paper.

Cellulose. A fibrous substance; cellulose fiber is the basis for all paper.

Chip Board. A cardboard made from low-grade mechanical wood pulp, chips, waste paper, etc.

Chipping. The feeding of logs used in papermaking against revolving knives to cut it to small chips.

Cleaning. Taking bark, knots, and dirt from wet paper pulp.

Cockle Finish. A natural or artificial puckering of paper during the drying process.

Coated Blank. Blank card coated on one or both sides, used for signs, etc.

Coated Paper. Surface-coated paper, with smooth, glossy finish, made for halftone printing.

Cover Papers. That used for pamphlet covers, mailing pieces in advertising, etc. Made from every variety of papermaking material.

Cut Cards. Small sizes of cards and tickets cut to standard sizes and shapes.

Cutting Stick. Strip of hard wood used in contact with the blade of a paper-cutting machine.

Dandy Roller. A device for making watermarks in paper.

Deckle. A featheredge on paper.

Digesting. Cooking wood chips in calcium bisulphate and steam, in the making of paper pulp.

Duplex. A paper, each side of which bears a different color or finish.

Eggshell Finish. A dull, rough finish, resembling that of an eggshell.

Enameled. Paper having a specially prepared surface of clay, glue, etc., and rolled very shiny.

End Papers. Paper placed at the front and back of bound books, and pasted to the covers next to the white sheet.

Engine Sized. Paper sized in the beating machines before the sheet is formed.

English Finish. A dull, yet smooth-finished paper of even surface.

Esparto. A papermaking fiber from a grass grown near the Mediterranean.

Felt Side. The smooth side of a piece of paper.

Fiber. A filament or plant cell composed of cellulose.

Fourdrinier. The name of a papermaking machine.

French Folio. A thin, smooth, sized paper, thicker than tissue.

Glassine. A thin, weak, glossy surfaced paper, chemically treated to be transparent.

Glazed Board. Sheets of mill board used by binders.

Glazed. Paper or board having a hard, glossy surface, used for box coverings, etc.

Grain. When the fibers of a paper lie to a large degree in one general direction, this is said to be the way the grain runs.

Half Stuff, Half Stock. Pulp after it has been washed, etc., before it goes to the beaters.

Hard-Sized. Paper sized by a special hardening process.

Humidity. The amount of moisture in the air relative to the temperature, which affects paper.

Index Bristol. Stiff and strong cardboard, used for index cards.

India Paper. A thin paper, usually of 20-pound substance, used in printing Bibles, encyclopedias and the like.

Jogging. Straightening paper into neat piles.

Kid Finish. Smooth paper or card resembling kid leather.

Kraft. A rough, strong paper in which the fibers are long, used in wrapping packages.

Laid. Paper having watermarked lines at equal distances.

Ledger. A heavy, strong, writing paper of best quality.

Ledger Bristol. Strong, hard bristol, made from best quality pulp.

Lining Papers. The end papers in a bound book.

Litho Board. A slightly coated and sized soft cardboard.

Litho Paper. A soft, sized paper, with very little stretch due to humidity changes.

Localized Watermark. One placed in a particular position in a sheet cut to a predetermined size.

Loft Dried. See air dried and pole dried.

Machine Dried. The process of drying paper by passing it over steam-heated cylinders on a papermaking machine.

Machine Direction. The direction in which the paper travels through the papermaking machine; the direction of grain.

Machine Finish. A press-finished paper, uncalendered.

M. F. Machine-finish paper, applied to common grades.

Magazine Paper. Suitable for printing and illustrations; used in periodicals.

Magazine Stock. Paper stock consisting of old magazines which are re-inked and ground to pulp for remaking.

Mailing Board. A corrugated or specially pressed strawboard.

Manifolding Paper. A thin, strong paper covered with carbon black on one side.

Manifold Tissue. Very thin paper used for duplicating work.

Manila. A strong paper used for tags, wrappers, etc.

Manuscript Cover. A cover stock of bond quality used to bind manuscripts.

Matt Surface. A dull, roughened surface on paper or board.

Mill Board. A very thick cardboard.

Mill Brand. A trade-mark and brand name, as distinguished from a jobber's brand.

Mimeograph Paper. Rough-finished, semi-absorbent paper, usually laid.

Mold-Made. Deckle-edge paper resembling that made by hand.

Newspaper. See newsprint.

Newsprint. Common, machine-finished, soft-sized paper made from mechanical wood pulp.

Offset. A rough book paper, with identical finish on both sides of the sheet.

Onionskin. Thin, translucent paper, with a glazed or unglazed finish.

Opaque. Not permitting passage of light.

Paper Cutter. A machine for cutting and trimming paper stock.

Papeteries. Various kinds of writing papers with envelopes to match, sold by stationers.

Paraffin Paper. Usually quite thin, which is grease-proof and air-tight.

Parchment Paper. A thin, tough, transparent paper, used for wrapping meats, butter, etc.

Pasteboard. Common board, made by covering middles by pasting.

Pasted Stock. Bristols, weddings and other stocks which have been pasted together in two or more thicknesses.

Pasting Finish. A rough finish applied on ledger papers, suitable for use on bookkeeping machines.

Plate Finish. A high, smooth finish produced by pressing the stock between zinc plates or by passing it through calender rolls.

Plated Paper. Made of new and old rags, together with clay, for halftone printing, a permanent but not shiny stock.

Pole Dried. Still wet paper from the machine, hung over poles to dry in a heated loft.

Pop Test. A test of bursting strength of paper under pressure.

Poster. A general term for paper suitable for poster work; a coarser and stronger stock than news.

Press Board. Smooth board of seasoned hardwood pulp, used usually for packing on presses; used also in bookbinding operations.

Print Paper. Common grades of unsized paper, used for magazines, books, etc., as distinguished from writing papers.

Proof Paper. Paper used for the making of printers' proofs.

Pulp. Soft, moist or dry material before it is made into sheets of paper.

Pulp Board. Stiff, thick-grade cardboard made from wood pulp.

Rag Paper. Paper stock made from linen or cotton rags.

Rag Pulp. Papermaking material consisting of cotton rags, shirt clippings, etc., used for the making of the best grades of bond, ledgers, etc.

Riffler. A machine for cleaning paper pulp.

Ripple Finish. A fretted finish in paper, similar to ripples on water.

Roughing. Treating a smooth-finish paper in a machine that destroys the glare either before or after printing.

S. & S. C. Sized and supercalendered. Generally known as super, and extra-glossy, smooth-finish paper.

Safety Paper. Used for checks, coupons; usually made by printing a design in a very light tint which will immediately show any erasures.

Soda Pulp. Pulp prepared by digesting wood with caustic soda.

Stock. Paper for a job; product or material on hand.

Substance Weight. The thickness of paper, figured per 500 or 1,000 sheets.

Sulphite Paper. Made of sulphite pulp, which is wood pulp, produced by a chemical acid process.

Super Calendered. An extra smooth finish or glazed paper.

Superfine. Term denoting extra-good qualities in paper.

Superglazed. Paper with an extra-glazed finish.

Surface Marks. Impressions made by means of letters or designs attached to a wheel which rests on the wet of paper when in its wet state in the process of manufacturing.

Surfaced Paper or Card. That which is coated and highly polished.

Telanian Finish. Similar to linen finish, but deeper and coarser.

Text. A high-class, rough-surfaced book paper.

Tissue. A very thin, unsized and nearly transparent paper.

Tub Card. Bristol board used for index cards.

Tympan. A heavy, tough, slightly glazed and oiled manila paper used on the platens and cylinders of presses.

Vellum Finish. A matt, dull finish.

Watermarks. Designs or lettering placed in paper while it is still in the pulp state, on the papermaking machine.

Wetting Down. A now obsolete process of dampening printing paper before it is printed.

Wood Pulp. Mechanical or chemical. The former is of low quality ground wood. Chemical wood pulp is further refined and called soda pulp or sulphite pulp.

Wrapping. A coarse paper made of burlap, ground wood, and waste papers.

Small or Large Drafting Classes—Which?

O. A. Northquest

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An experiment to determine the achievements of students in large drafting classes (40 to 45 students) as compared with the achievements of students in smaller (20 to 25) classes.

The subject of class size has been a matter of much controversy for several years. "Tradition has fostered the smaller class, and the teachers, in general, have rebelled whenever there has been a suggestion of increasing classes beyond the established size."[1] It is not uncommon today to find as many as fifty or sixty students in a shop laboratory at one time. As to what the limit in the number of students in one class will be, and when those limits will be reached, was not the purpose of this study to predict. It seems only reasonable to state that there should be a limit to the number of students thrust upon the teacher; beyond that limit a hardship is being forced, not only upon the teacher, but upon each member of the class as well. It is the consensus of opinion of industrial-arts teachers as well as academic teachers that the size of the class is an influencing factor upon the achievements of the class as a whole. Many industrial-arts teachers maintain that industrial-arts work is of such a nature that education in the practical arts cannot be done on a production basis. It is possible that knowledge of materials, skills in the manipulation of tools, and good technique as well as attitudes and appreciations cannot be acquired in large classes to so high a degree as is possible in smaller classes. It was, therefore, the purpose of this experiment to measure only achievements of factual knowledge and the quantity and quality of work accomplished.

The Experiment

In the preparation for this experiment, it was recognized that class size alone does not influence the achievements of the students in a class. Such variable factors as the ability of the teacher, the spread of the ability of the class, the chronological age of each individual student, the previous experiences of the students, the course of study, the physical equipment of the room, and the general intelligence of the group have a decided effect upon the achievements of the class. However, these variables were held as nearly constant as is practicable throughout the experiment. The one factor that was permitted to be varied for the two classes was class size. The same room and equipment were used for both classes. All equipment, including pencils, paper, and erasers were furnished to both classes. Each class reported for nineteen 45-minute periods.

To obtain homogeneous groupings, the I.Q. of each student in the small class was equated with the I.Q. of an equal number of students in the large class. The academic rating for each group was equated. To determine these, the average was taken from marks received the previous semester in English, arithmetic, and social science. The chronological age of each group was also equated. Since this experiment also concerned manipulative work, it was decided to have all students of about the same age. The same teaching methods and course of study were used for both classes. The author was very careful to follow both in detail. What was told to one class was similarly retold to the other class. The same illustrations were used for both classes.

To determine the acquired knowledge of the subject, a test of 100 statements covering related information was given to each class the second time they reported for drawing, the first period being used to arrange the seating order and to check the roll. This same test was given the last day each class reported. The fourth time the classes reported, a test was given to test their ability to read mechanical drawings. This same test was also repeated at the end of the semester. At mid-semester, a short mechanical-drawing reading test and

[1]Van Westrienen, H. J., "Handling Large Classes," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION MAGAZINE, 22:245.

a short test on related information were given.

The 100-statement test of "yes-no" questions was selected from examinations that the author had used many times previous to the performing of this experiment. Most of these questions were originally selected from *Test Questions in Industrial-Arts Education.*[2] Since this was to be an experiment in 7th-grade mechanical drawing, questions that would be easily understood were selected, and long, complex sentences were eliminated as much as possible.

The reading test that was given consisted of a test of 9 problems devised by H. P. Gerber for his thesis, "The Construction and Validation of a Performance Test in Orthographic Projection."[3] However, it so happened that when this test was given as a final examination in reading, one student in each class completed all of the problems with a grade of 100. This would indicate that they could possibly have completed more problems or more difficult ones.

For the mid-semester informational test 25 statements were selected from material the students had covered up to that time.

For the mid-semester reading test, 4 problems were selected from tests that had been used in previous years.

The plates that were used for the experiment were the ones that were in the course of study adopted by the school administration. A perspective drawing of the problems that were to be drawn was put on the blackboard sufficiently large so that it could easily be seen by every student. Each student made a working drawing of as many problems as time would permit. When he had a plate completed as best he could he would ask for a "check." If the plate were not complete or if there were errors, the author would point out these deficiencies and ask that they be corrected. The plates were then handed in for a grade and the next plate was begun.

To secure an objective grade in the plates, three drawing instructors rated each plate. This was done by placing them in order of rank into five piles. The ratings of each instructor were recorded. To arrive at a mark for each plate, the three ratings were averaged. The final mark for work accomplished was determined by averaging the number of points received on all plates finished.

The grade on the nonmanipulative work was kept separate from the grade on the manipulative work. This was done for two reasons — namely, to determine the difference in achievement of nonmanipulative work, and to determine the achievement of manipulative work. It was not deemed advisable to average these marks, as one class might do better on one phase of work and the other class better on the remaining phase of work.

The data sheet shows that each student has a grade for each test that was given. He also has a grade which gives the quality of his work while in the drawing laboratory. Then, too, the number of units of work completed are listed. The mean and median are also listed for each test given, as well as for the quality and quantity of work accomplished.

For the calculation of the coefficient of reliability of the tests given, the scores made on each test were divided into two parts. The scores made on the even-numbered items were correlated with the scores made on the odd-numbered items. Brown's formula was then applied to step up the result. The coefficient of reliability on the 100-statement informational test was .90, on the short informational test of 25 statements, .70, and on the mechanical-drawing reading test of nine problems it was .70. This reliability is not as high as the author had hoped to attain. However, in the mechanical-drawing reading test, it was not possible to increase the number of problems as 7th-grade students are not capable of completing many problems during a 45-minute period.

Results

The achievements of the two classes did not vary to any great extent. The quality of the work achieved by the students of both classes was much the same; however, the quantity of the work achieved by the large class was much less than that achieved by the small class. The scores made in the various tests that were given were very much the same. The students of

Student's Number	RATING					
	Academic		Chronological Age in Months		I.Q.	
	Classes		Classes		Classes	
	Small	Large	Small	Large	Small	Large
1	75	77	155	149	104	112
2	82	70	164	165	114	106
3	83	88	161	155	95	105
4	73	87	158	153	104	115
5	82	78	158	157	102	109
6	77	80	159	155	113	108
7	75	82	156	158	108	105
8	82	83	156	155	108	96
9	73	80	157	168	113	103
10	85	82	151	152	107	126
11	73	83	152	156	101	110
12	82	82	157	163	113	111
13	92	77	161	156	111	102
14	82	77	153	154	108	109
15	78	75	152	155	112	108
16	83	76	156	159	104	109
17	82	78	159	152	107	104
18	75	77	155	172	101	95
19	78	83	153	160	110	104
20	78	73	150	153	113	99
21	85	87	163	151	111	113
22	80	80	153	163	96	98
Total	1747	1754	3447	3446	2355	2346
Mean	79.4	79.4	156.6	157.5	107.	106.6
Med.	83	80	157	156	108	108

Table I. Students' ages and Intelligence Ratings

Student's Number	PLATES			
	Quantity Classes		Quantity Classes	
	Small	Large	Small	Large
1	78.3	76.5	4	4
2	79.7	80.4	5	5
3	84.		7	
4	84.9	84.8	6	5
5	93.3	87.7	5	7
6	80.	90.	4	7
7	84.	82.	5	5
8	90.9	83.	5	4
9	83.	78.	2	4
10	81.8	80.	6	3
11	84.5	92.9	5	4
12	83.5	89.5	4	5
13	87.	91.1	8	4
14	84.2	78.3	5	2
15	88.2	80.6	8	7
16	94.	80.6	8	3
17	85.5	74.8	6	2
18	86.6	84.7	6	6
19	81.	86.2	6	5
20		80.		4
21	85	81.8	8	6
22	78.9	81.1	4	7
Total	1778.2	1744.3	117	99
Mean	84.6	83	5.5	4.7
Med.	84	81	5	5
S. D.	4.15	4.83	1.14	1.11
P. E.	.61	.70	.16	.16
P. E. of Diff. 92			.22	

Table II. Quality and quantity of the plates completed by the students

Student's Number	SCORES					
	Pretest Classes		Mid-Semester Classes		Final Test Classes	
	Small	Large	Small	Large	Small	Large
1	11	0	60	45	63	75
2	22	33	40	65	69	63
3	44		100		74	
4	11	44	60	100	46	69
5	27	61	60	100	80	78
6	38	50	70	100	56	100
7	11	34	90	70	70	79
8	21	33	90	75	75	63
9	38	23	100	90	73	69
10	11	33	80	90	74	63
11	21	39	90	75	63	75
12	0	39	40	100	89	95
13	33	39	90	85	80	85
14	11	11	100	75	85	45
15	44	39	80	70	67	74
16	77	22	80	95	100	84
17	44	0	90	50	74	45
18	33	22	90	60	74	79
19	44	78	70	65	73	48
20	49	33	90	85		85
21	49	33	90	100	89	90
22	28	44	85	90	62	85
Total	618	660	1745	1685	1536	1549
Mean	28.	31.4	79.3	80.2	73.1	73.8
Med.	33	33	87	85	74	75
S.D.	17.76	16.97	3.68	3.81	13.26	19.37
P.E.	3.79	2.43	.52	.83	1.94	2.84
P.E. of Diff.		4.5		.97		3.43

Table III. Scores on the reading tests

Student's Number	SCORES					
	Pretest Classes		Mid-Semester Classes		Final Test Classes	
	Small	Large	Small	Large	Small	Large
1	66	43	84	80	64	64
2	65	54	80	88	77	69
3	64		68		57	
4	51	35	68	80	65	81
5	47	72	84	84	63	72
6	55	52	92	64	75	86
7	41	39	92	92	61	65
8	44	41	96	88	78	59
9	36	41	88	76	76	67
10	51	45	80	92	78	87
11	40	53	92	88	71	81
12	49	48	84	84	76	91
13	41	44	92	96	85	44
14	53	63	96	76	82	68
15	58	50	92	52	83	73
16	62	58	68	72	72	46
17	51	33	84	76	82	80
18	57	50	88	68	73	56
19	56	46	88	76	82	68
20	30	53		76		64
21	56	40	80	73	77	79
22	58	58	88	76	75	71
Total	1131	1017	1804	1656	1553	1471
Mean	51.4	48.4	85.9	78.8	73.9	70.
Med.	52	48	88	76	76	71
S.D.	10.26	9.54	2.41	11.87	5.71	12.68
P.E.	1.47	1.39	.52	1.74	.83	1.85
P.E. of Diff.		2.02		1.92		2.02

Table IV. Scores on the informational tests

[2]Hunter, Wm. L., *Test Questions in Industrial-Arts Education*, Iowa State College, Ames, Iowa. 1932.

[3]Gerber, H. P., *The Construction and Validation of a Performance Test in Orthographic Projection.* Unpublished Thesis. Library, Iowa State College, Ames, Iowa. 1935.

the small class did score a bit higher than did the students in the large class, but this difference is not significant.

Table I lists the academic rating, chronological age in months, and the I.Q. rating of each student in the two classes. Upon examination of the arithmetical mean for each class, it is evident that the two classes were equated within very close limits.

Table II lists the scores made by each student on the drawing plates completed, and the number of plates completed. Upon the examination of the mean and the standard deviation of the scores made on the plates, it is evident that the quality of the work completed by the two classes was much the same. However, the small class did considerably more work. When the difference of the means, which is .8, is divided by the probable error of the difference of the means, which is .22, the result is 3.63. The result makes it almost conclusive that a small class in almost every case will do more work than a large class.

Table III lists the scores made on the reading tests. Upon examination it is evident that one class gained little more than the other. If the experiment were repeated, it is quite likely that the results might be reversed.

Table IV lists the scores made on the informational tests. Here again, upon examination, it is evident that one class gained little more than the other.

Summary

1. To begin the study, the small class consisted of 22 students and the large class consisted of 44 students. One student was lost from each class during the experiment.

2. The students in the small class did 14.5 per cent more work than did the students in the large class.

3. When the results of the first and the second application of the reading tests were compared, the results showed that the students in the small class gained 27.8 per cent more than the students in the large class.

4. When the results of the first and the second application of the informational test were compared, the results showed that the students in the large class made a gain of .9 per cent more than the students of the small class.

5. There was little difference in the quality of the plates completed by the two classes.

Conclusions

The following conclusions may be drawn from the data obtained by this experiment.

1. There is a possibility that students in small classes do significantly more work than students in large classes.

2. Students in a small class will not achieve more factual knowledge than will the students in a large class.

3. There is no difference in the quality of manipulative work of laboratory nature.

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How We Run Our Stamp Club

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Explicit directions on how to organize and conduct this type of students' club.

Stamp collecting is called the king of hobbies and the hobby of kings. In the United States we could include presidents.

Many persons regard stamp collecting as a hobby for timid souls who wish to be by themselves in looking over and hoarding stamps. They are regarded as stamp hermits. The proportion of the hermit type is small. Most people like recognition, therefore, they like to gather in small or large groups to "show off" their wares. This exchange of ideas usually stimulates the collector to keep up to date with his hobby.

Approximately two out of three boys collect stamps and one out of three is rather serious about it. Boys collect stamps by "spells," that is, they collect for a few years, give it up, then collect again. The number of girls collecting stamps is smaller, but there are a number that have a very enthusiastic interest in philately. We have a girls' stamp club in our school. We also have one boys' stamp club of sixty members and about forty honorary members. The honorary members pay dues and receive the benefits of the club but cannot come to meetings because of conflicts in their programs.

Joining the Club. An active interest in stamp collecting, payment of club dues (indigent pupils are excused from paying dues), willingness to be on club programs, making stamp exhibits, and a willingness to enter the final stamp competitive exhibit, are the only requirements for joining the club.

The size or value of the candidate's collection has no bearing on entering the club. Any person is eligible regardless of age or grade. By letting in younger boys the club is "bolstered" for future years. The girls have a separate club.

Election of Officers. Officers are elected at the first meeting each year. This gives the sponsor a group to work with immediately in planning future work. It is very important to get programs started right away for the second meeting. Because of the large size of our club, sixty active and forty honorary members, we elect one president, three vice-presidents, a secretary, and a treasurer.

Before the election, the sponsor stresses the point of electing capable officers, who are willing to devote time after school in preparing programs and meetings.

The president has charge of the club with the aid of the sponsor. The stronger

the president, the more responsibilities can be turned over to him. If the president is weak, then the sponsor will have to assume more responsibilities. The first vice-president is in charge of making out programs, the second vice-president is in charge of first-day covers, and special issues, and the third vice-president is in charge of exhibits and the bulletin board.

The first vice-president is expected to take direct charge of every third or fourth meeting as agreed to with the president. The secretary should have legible handwriting and be capable of taking brief notes and transcribing them into interesting minutes. The treasurer should be honest. There should be a check on the treasurer with an auditing committee.

The committees are formed by the sponsor and officers. Try to get different persons on various committees. Keep committees small. Someone has said, "A committee should consist of three people with two absent at every meeting."

Stamp-Club Objectives. The sponsor has a meeting with the officers directly after the election. He discusses with these new officers, the objectives of the club for the semester. This is not so difficult now because we take the objectives of the previous semester and revise the list to meet the present need. (NOTE: We never run two semesters exactly alike.) A tentative list of objectives is then made and submitted to the club for approval at the second meeting. With very slight changes it usually passes the club's approval. The objectives are then duplicated and each member receives a copy.

The objectives for this semester are as follows:

Objectives for Stamp Clubs

1. To conduct the club in a businesslike way. (Officers, etc.)
2. To promote neighborhood stamp groups or small stamp clubs.
3. To teach the fundamentals of stamp collecting.
4. To promote stamp trading (before or after regular meeting).
5. To promote stamp collecting as a hobby.
6. To get good speakers for the club.
7. To encourage keeping up to date on U. S. stamps, either used or unused varieties.
8. To encourage everyone to collect from more than one country.
9. To encourage a general collection for beginners.
10. To give everyone an opportunity to appear on a program.
11. To make a survey of all the stamp collectors in the school.
12. To make a stamp-collector's directory for the school.
13. To make a stamp-club directory.
14. To give publicity to the newspapers (school paper and local paper).
15. To promote general interest in stamp collecting through the bulletin board.
16. To promote a stamp exhibit for the club.
17. To promote a stamp contest for the club.
18. To promote fair play and good sportsmanship in all our stamp work.
19. To send for first-day covers.
20. To keep in touch with the check list of stamps for sale at Washington, D. C. (Third assistant Postmaster General).
21. To write to Washington, D. C., and have name put on mailing list for new stamp issues.
22. To know how to send a money order when sending for stamps.
23. To encourage school and local libraries to get annual stamp catalog and new books.
24. To promote the reading of stamp magazines in the library (catalog).
25. To enter current hobby shows.
26. To enter current stamp contests.
27. To purchase at Washington unused U. S. stamps at cost.

NOTE: The above is only a check list of some of the activities for stamp clubs. Select the ones you can use for your particular club. Add new ones, if necessary.

Starting the Meeting. Start promptly. Make the formal part, minutes, notices, etc., as brief as possible because club members do not enjoy dull notices from the president, secretary, or committees. Make every member feel the responsibility for the club's success.

What makes a successful club:

First: The officers should be hard-working individuals.

Second: The club should have an interested, active sponsor.

Third: The meeting should captivate and hold the interest of the members.

Many clubs are unsuccessful because they follow the lines of least resistance. They do things that should work but don't.

We had the following experience. We felt that stamp trading should be included in the regular program. After three semesters, we found out that only a small per cent bring stamps to trade for various good reasons. After dropping out stamp trading, our club runs smoother and everyone is more satisfied. Stamp trading is now conducted after the regular meetings.

Getting Outside Help. Get some older stamp collectors to speak before the club and give some advice. Go to an adult club meeting for suggestions. Do not copy everything from an adult club because some of their meetings are very dull. *Do things that will interest your particular group.*

Planning Programs. At the first meeting of the officers, we plan the program for the next meeting. We also plan the general outline for the semester's program. We notify the members on the programs and have a rehearsal before the officers. The sponsor is not present for rehearsals.

A typical program is as follows:

1. Meeting called to order by the president.
2. Roll call by the secretary.
3. Secretary reads the minutes.
4. Discussion of old business.
5. New business.
6. Report on new stamps.
7. Country guessing game.
8. Exhibits of stamps and talks.
9. Discussion (open). For example, one boy wanted to know why the Michigan Centennial stamp was issued in 1935 instead of 1937 because Michigan was first admitted as a state in 1837. The president appointed someone to find out for the next meeting. The boy gave an excellent report.
10. Announcement of next week's program.
11. Adjournment.
12. Informal trading of stamps.

High Lights for this Semester's Program

1. Mr. Burleigh Jacobs, nationally known stamp collector, as speaker.
2. Mr. E. E. Born, principal of school, as speaker.
3. Fish pond.
4. Visit Milwaukee Museum.
5. Stamp jamboree.
6. Stamp guessing contest.
7. A twelve-stop stamp tour of the globe.
8. Felt emblems made for members.
9. Stamp approval sheets.
10. Final stamp-exhibit contest.
11. Awarding the ribbons to the winners.

Try Some of the Following in Your Stamp Club

The Fish Pond. We have been very successful with a stamp fish pond for raising money and exchanging stamps at the same time. Each person puts in ten or more stamps in a sealed envelope. Each envelope has at least two or three good stamps in it, the others might be common traders. All envelopes are donated to the club. Then the fish-pond committee sells tickets for two

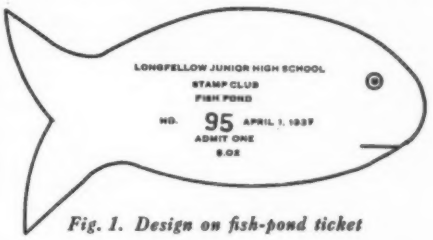


Fig. 1. Design on fish-pond ticket

cents each (See Fig. 1) and the ticket entitles the pupil to "fish" once for one of the envelopes. We usually have a few prize packets in the pond donated by the sponsor. So far, this has been a good way to raise money, exchange stamps, and change the variety of our program.

Stamp Debates. One question could be: Why we should or shouldn't collect any certain varieties of stamps.

Why I Collect Stamps. Have the members tell or write why they collect stamps. Give everyone an opportunity to be on the program.

Competitions. With a little ingenuity, one can develop some type of game to be played by members.

Country Guessing Game. A member of the club describes a country but does not name it. The club members try to write the correct name on a piece of paper. A count is kept on all countries. The winner receives a prize.

Stamp Guessing Game. Someone describes a stamp and the members try to name the stamp. It is a good plan to keep a record of all games and record winners, regardless of whether a prize is given or not.

Stamp Acting. Some students like to act. Have the members portray in pantomime some of the pictures on stamps.

Stamp Auction. Pupils wishing to auction some of their stamps before the club are permitted to do so. An auctioneer could be appointed.

Auction By Written Bid. Stamps are exhibited in frames or closed bulletin boards. Each stamp is numbered. Pupils wishing to bid write the name and number of the stamp and the amount they are willing to pay for it. The highest bidder gets the stamp. NOTE: The club could collect a certain amount as commission for handling the auction.

Using Opaque Lantern for Stamp Talks. A group of boys can give a very interesting talk with the aid of an opaque lantern. The stamps show up in natural colors on a screen which permits a large group to see the stamps at one time.

The Sponsor. The sponsor of any club should be friendly toward the club and also active. It is not necessary to be an expert at stamp collecting to run the club, but one should start stamp collecting personally if he has a stamp club.

Door Prizes. We give out at least one door prize every week. We now give a small five-cent picture frame which we purchase at a five-and-ten-cent store. Those frames are used by the members to exhibit single stamps and blocks of fours.

First-Day Covers. We send special envelopes to the postmasters of specified cities when new stamps are issued. We enclose a money order to the postmaster for the postage to return the self-addressed envelopes to us in the first-day sale. We get our information from magazines and the government.

Demonstrations. The boys give demonstrations on the various ways to mount stamps, use stamp tongs, soak off stamps, etc.

Stamp Fundamentals. We make it a point to cover stamp fundamentals every semester because of new members.

Stamp Map. A very attractive stamp map can be made by most everyone with a little patience. The map is mounted on heavy cardboard, the stamp arranged carefully around the map. A red thread is sewed from the stamp (not through) to the country. H. E. Harris Company, 108 Massachusetts Avenue, Boston, Mass., have a free interesting folder on stamp maps.

Milwaukee Museum. The stamp collectors around Milwaukee should visit the Public Museum and see the fine stamp exhibit there. It is a permanent exhibit donated by Mr. Uihlein.

School Stamp Directory. Make a list of all the stamp collectors in your school with their addresses, telephone numbers, and the kind of stamps they collect. Make duplicate copies and give all collectors a copy.

Stamp-News Sheet. Don't try to make a stamp magazine. Many are published, which are better than any local club can produce. The stamp-club typist can duplicate the stamp news of the school. If you do not have the talent, omit the news sheet some semesters. We have found out that it is impossible to have everything every semester. News sheets should be interesting to readers.

Stamp Magazines. Stamp magazines are very useful in keeping one informed about new stamps, collectors, and "new finds." The interest in any hobby goes up and down, and a good magazine keeps stamp collectors on a more even keel. They are really a necessity. The cost is very little. A list of some of the stamp magazines will appear at the end of the article.

Stamp Catalog. The school should have at least one copy of the current Scott Standard Stamp Catalog. It is an overnight book in our school and without a doubt has the greatest circulation of any book. If possible, two copies should be provided.

Writing to American Consuls. Some of the boys write to the American consuls in foreign countries for stamps. The results are gratifying. Questions are cheerfully answered. Here is a list of addresses of American consuls:

Argentina, Buenos Ayres
Belgium, Antwerp
Bolivia, La Pas
Brazil, Rio de Janeiro
Bulgaria, Sofia
France, Paris
Germany, Berlin
Great Britain, London
Australia, Sydney
India, Calcutta
Union of South Africa, Cape Town
Greece, Athens
Japan, Secul
Liberia, Monrovia
Mexico, Mexico City
Morocco, Tangier
Palestine, Jerusalem
Rumania, Bucharest
Siam, Bankok
Turkey, Constantinople
Austria, Vienna
Chile, Valparaiso
China, Canton
Columbia, Barranquilla
Costa Rica, San Jose
Cuba, Havana
Czechoslovakia, Prague
Free City of Danzig, Danzig
Denmark, Copenhagen
Dominican Republic, Puerto Plata
Ecuador, Guayaquil
Egypt, Alexandria
Estonia, Tallinn
Ethiopia, Addis Ababa
Finland, Helsingfors
Canada, Montreal
Newfoundland, St. John's
Irish Free State, Dublin
New Zealand, Wellington
Kenya, Nairobi
Nigeria, Logos
Guatemala, Guatemala
Haiti, Cape Haitiem
Hungary, Budapest
Iraq, Bagdad
Italy, Naples
Latvia, Riga
Lithuania, Kovno
Netherlands, Amsterdam
Nicaragua, Bluefields
Norway, Oslo
Panama, Panama
Paraguay, Asuncion
Persia, Bushire
Peru, Callac-Lima
Poland, Warsaw
Salvador, San Salvador
Spain, Barcelona
Sweden, Stockholm
Switzerland, Zurich
Syria, Beirut
Uruguay, Montevideo
Venezuela, Caracas
Iran, Taharan
Seoul, Chosen

Neighborhood Stamp Club

This information sheet is handed to members to encourage home groups.

Have you ever thought how much fun it would be to have a stamp club for your own neighborhood or for a group of your friends? If you have, you no doubt have questions about the formation of the club. It is really a very simple matter. Assemble the boys and girls who desire to form this club at your home, your church, or any other meeting place you desire.

A very simple constitution is all that is necessary. One that will embody the name and the object, enumerate the officers and their duties, form rules, and designate the type of members you desire to take into your club. Embody in the constitution your meeting night and your various committees.

The following should be your order of business for the meetings:

1. Call the meeting to order.
2. Secretary reads the minutes of the last meeting.
3. Reading of communications.
4. Reports of various committees.

5. Unfinished business.
6. New business.
7. Good and welfare.
8. A fifteen-minute talk, or longer if desired, or the reading of some paper pertaining to some stamp or stamps.
9. Trading or buying from each other.
10. Adjourn for refreshments.

How To Earn an Emblem

To earn a 50- or 100-point emblem in either of the two junior-high stamp clubs, the applicant must give successful talks, exhibits, stamp information, a demonstration, and must visit the stamp collection at the public museum. He must be interested in his stamps and in stamp collecting. He must show his knowledge of collecting by passing an examination covering the following subjects:

1. The uses of perforation, glue, color, and cancellation of a stamp.
2. The names of the presidents on each of the U. S. stamps.
3. The distinction of the kinds of stamps, revenue, documentary, postage due, special delivery, and the like.
4. Any information covered in topics or club discussion.

Before receiving the emblem, the person must have the club's approval, as the members know how hard the applicant has worked. Any 9A that shows work in the club will receive an emblem without receiving the entire 50 points. The persons who have greater ability may work toward a 100-point emblem, which will be conferred after they have acquired another 50 points.

The Minimum for 50-Point Emblem

Exhibits — 8 points
Topics — 12 points
Scrapbook — 2 points
Demonstration — 15 points
Information — 3 points
Museum visit — 5 points

The Minimum for 100-Point Emblem

Exhibits — 5 points
Topics — 15 points
Demonstrations — 15 points
Information — 5 points
Museum visit — 5 points

The emblem is printed on white felt and represents the upper right-hand corner of an envelope. The stamp is red. The cancellation is black. It is very attractive. The design is shown in Figure 2.

Reminder. Naturally, the sponsor should have a good idea of the objectives of his club and then go about to achieve them, otherwise the club will run the sponsor and ruin the club. Committees should be small. Success depends on your ability to get the members working for the club.

"Philatelic Society" is a good name but it is better to call your club a "Stamp Club."

Exclude undesirable members by a vote of the club.

Exhibit at hobby shows.

Have stamp trading before or after the regular meeting.

Some Stamp Facts. We give out printed sheets like the following to members of the clubs:

Stamps used in *Alaska* are United States stamps.

A *cover* is the entire envelope with the stamp on it.

A *cut square* is the stamp part of the envelope cut square.

To detect *counterfeits,* one must possess a greater knowledge than the average collector. You will acquire this knowledge as you go along.

French colonial stamps are not counterfeits. They are of low monetary value and were printed at the Bureau of Engraving at Paris for sale to dealers.

A stamp printed *tête-bêche* means that one stamp was printed upside down to the other. You must naturally have a pair of stamps to show this effect.

A *bisected* stamp is, for example, a ten-cent stamp cut in half and used as a five. Some foreign governments permit this in times of necessity.

If a date appears on a stamp earlier than

Fig. 2. Club emblem

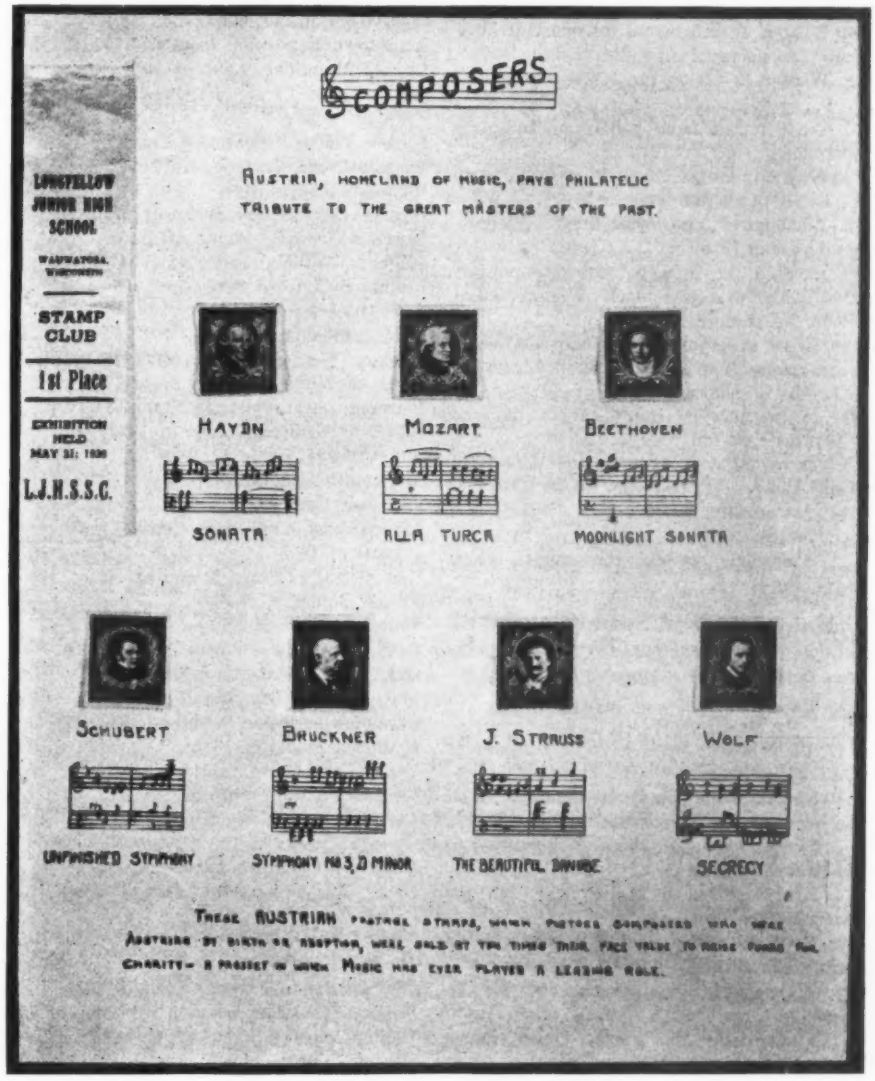

COMPOSERS
AUSTRIA, HOMELAND OF MUSIC, PAYS PHILATELIC TRIBUTE TO THE GREAT MASTERS OF THE PAST.
LONGFELLOW JUNIOR HIGH SCHOOL
WAUWATOSA, WISCONSIN
STAMP CLUB
1st Place
EXHIBITION HELD MAY 31: 1936
L.J.H.S.S.C.
HAYDN
MOZART
BEETHOVEN
SONATA
ALLA TURCA
MOONLIGHT SONATA
SCHUBERT
BRUCKNER
J. STRAUSS
WOLF
UNFINISHED SYMPHONY
SYMPHONY NO 3, D MINOR
THE BEAUTIFUL DANUBE
SECRECY
THESE AUSTRIAN POSTAGE STAMPS, WHOSE PICTURES COMPOSERS WHO WERE AUSTRIANS BY BIRTH OR ADOPTION, WERE SOLD AT TWO TIMES THEIR FACE VALUE TO RAISE FUNDS FOR CHARITY— A PROJECT IN WHICH MUSIC HAS EVER PLAYED A LEADING ROLE.

Fig. 3. Prize-winning exhibit showing ribbon

1840, it is placed there to commemorate some event, as the first postage stamp was issued in 1840.

First-day covers are worth-while collecting, as they commemorate some event, or the issue of a new set of stamps.

A *surcharge* is an overprint placed upon the original stamp to either increase or decrease its value, or to make the stamp available for use in some colony of the particular country.

Cancellations should be studied. They tell an interesting story of their own and form another link in the thought. STUDY YOUR STAMPS!

Stamp-Club Quiz

Once in a while we give a brief examination to the members of the club to test their knowledge on certain parts of our program. The officers make out the questions. A sample set is given below:

1. The projections on the side of a stamp are called .....
2. The latest U. S. stamp is the ..... issue.
3. Whose picture is now on the U. S. 4-cent stamp? .....
4. What is another name for mucilage on a stamp? .....
5. What is a cachet on a first-day cover? .....
6. What recent issue had a cracked-plate impression? .....
7. Why are almost all U. S. 2-cent stamps red, 3-cent purple, etc.? .....
8. What main stamp event are we celebrating all year in U. S.? .....
9. In 1923, the U. S. put out a commemorative stamp that was black. Whose picture was on this stamp? .....
10. What is the most commonly used color in commemorative issues? .....
11. All U. S. stamps have perforation .....
12. A precancelled stamp cannot be used by a private person .....
13. A re-engraved stamp is the same as a reprint .....
14. A stamp found on a deck of cards is a documentary .....
15. First-flight covers commemorate a new postal route .....

Rules for Final Stamp Contest

Each year the students revise the regulations governing the stamp contest.

Judges: Mr. Smith
Mr. Brown

1. All exhibits must have a transparent covering over them.
2. Names of the contestant should be in an envelope on the back of the exhibit.
3. Every member of the club is entitled to one exhibit without cost.
4. Every additional exhibit will cost the contestant ten cents.
5. Extremely fancy exhibits will receive no extra credit.
6. Accuracy in arrangement will be considered.
7. Fingermarks and smears count against the exhibit.
8. The exhibit must have some printing or explanation to win.
9. Condition of stamps will be considered.

* * *

Dates:

Enter exhibit on .....May 22–23
They will be judged.....May 24–25
Take them home on.....May 25–26
Ribbon awards will be given out on..June 2
(See winner's ribbon award in Fig. 3.)

* * *

Percentages

Each exhibit will be graded according to this scale:

Idea (originality)	30
Accuracy of mounting.....	20
Neatness	20
Condition (stamps).....	10
Explanation	20
	100%

Check List of United States Commemoratives 1893–1937

The unknown commemoratives
Columbian Exposition Series of 1893
Trans-Mississippi Exposition Issue of 1898
Pan-American Exposition Series of 1901
Louisiana Purchase Exposition Series of 1904
Jamestown Exposition Issue of 1907
Lincoln Memorial Stamp of 1909
Alaska-Yukon-Pacific Exposition Issue of 1909
Hudson-Fulton Celebration Issue of 1909
Panama-Pacific Issues of 1912–15
Victory Stamp of 1919
Pilgrim Tercentenary Series of 1920
Harding Memorial Stamp of 1923
Huguenot-Walloon Series of 1924
Lexington-Concord Series of 1925
Norse-American Issue of 1925
Sesquicentennial Issue of 1926
Ericsson Memorial Stamp of 1926
Battle of White Plains Stamp of 1926
Vermont Sesquicentennial Stamp of 1927
Burgoyne Campaign Issue of 1927
Valley Forge Stamp of 1928
Monmouth Issue of 1928
Hawaiian Commemorative Issue of 1928
International Civil Aeronautics Conference Issue of 1928
George Rogers Clark Stamp of 1929
Edison Stamp of 1929
Sullivan Expedition Stamp of 1929
Battle of Fallen Timbers Stamp of 1929
Ohio River Canal Stamp of 1929
Massachusetts Bay Stamp of 1930
Carolina-Charleston Stamp of 1930
Braddock Stamp of 1930
VonSteuben Commemorative of 1930
General Pulaski Stamp of 1931
American Red Cross Commemorative Stamp of 1931
Yorktown Commemorative of 1931
George Washington Bicentennial Series of 1932
Third Olympic Winter Games Stamp of 1932
Arbor Day Stamp of 1932
Olympic Summer Games Issue of 1932
William Penn Commemorative Stamp of 1932
Daniel Webster Stamp of 1932
Georgia Bicentennial Stamp of 1933
Peace Commemoration Stamp of 1933
Century of Progress Issue of 1933
National Recovery Stamp of 1933
Byrd Antarctic Stamp of 1933
Kosciusko Stamp of 1933
National Exhibition Stamp 1934
Maryland Stamp of 1934
Mothers of America Issue of 1934
Wisconsin Stamp of 1934
National Parks Issue of 1934–35
Connecticut Tercentenary Stamp 1935
California Exposition Stamp 1935
Michigan Centenary Stamp 1935
Boulder Dam Stamp 1935
Texas Centennial Stamp of 1936
Rhode Island Tercentenary Stamp 1936
Arkansas Centennial Stamp 1936
Oregon Territory Stamp 1936
Woman Suffrage Stamp 1936
Army and Navy Issue of 1937

Herewith is a list of books, magazines, etc. In each case the publisher's name is given first:

Dodd, Mead, New York, Phillips, *Stamp Collecting*, $3.

Dodd, Mead, New York, Phillips, *Postage Stamps and Their Stories*, $2.

Dodd, Mead, New York, Phillips, *Beginner's Book of Stamp Collecting*, $2.

McGraw-Hill Book Co., New York, *American Story as Told in Postage Stamps*, $2.50.

Bobbs Merrill Co., Indianapolis, Ind., Ellis, Britten, *The Young Stamp Collector*, $2.75.

Scott Stamp and Coin Co., 1 West 47th St. New York City, *How to Build a Stamp Collection*, 50 cents.

Leisure League of America, 30 Rockefeller Plaza, New York City, Renauf, *Stamp Collecting*, 25 cents.

A. L. Burt & Co., New York City, *Burt's Handbook for Stamp Collectors*, $1.

Blue Robbin Books, New York City, *The Stamp Collector's History of the United States*, $1.

Grosset & Dunlap, *How to Collect Stamps*, $1.50.

Cupples and Leon, 470 Fourth Avenue, New York City, *Famous Stamps and Their Stories*, $1.

H. L. Lindquist, 2 West 46th Street, New York City, *Stamp Collecting*, $2.50.

Weekly Papers

McKeel's Weekly Stamp News, Portland, Maine, per year, $1.

Philatelic Gossip, Holton, Kansas, per year, $1.

Stamps, 2 West 46th St., New York City, per year, $1.

Linn's Weekly Stamp News, 20 E. Chestnut St., Columbia, Ohio, per year, 50 cents.

Semiweekly

Western Stamp Collector, Albany, Oregon. per year, 85 cents.

Monthly

Hobbies, 2810 S. Michigan Ave., Chicago, Ill., per year, $1.

Precancel Bee, 170 Claremont Ave., Verona, N. Y., per year, $1.

Catalogs

Scott Stamp and Coin Company, 1 West 47th St., New York City, *Standard Postage Stamp Catalog*, cloth, $2.50, index, $3.00; *United States Stamp Catalog*

H. E. Harris Company, Boston, Mass., free booklets for stamps clubs

According to Richard MapCabeen, stamp editor of the *Chicago Tribune:* "About 150 newspapers publish weekly stamp columns. A few of these are twice a week. There are perhaps as many as 300 or 400 other newspapers which receive syndicated stamp news through the Associated Press, King Features, or some other syndicate. Magazines such as Boy's Life, Young America, St. Nicholas, American Boy, Open Road for Boys, Popular Mechanics, etc., have stamp columns."

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

J. J. Metz, Editor

The Ogre of Unemployment

It is somewhat disquieting to read the prophecies coming from various sources as to the future of our country. There are the government welfare officials who state that the United States must henceforth be ready to feed and care for approximately eight million unemployed. Writers, quoting from other sources or having made other estimates, jubilantly aver that the country, so far as numbers employed and wages paid are concerned, is at or ahead of the old-time prosperity level, at least in certain industrial fields. In one's own surroundings, there are still many jobless dependent on public relief. Others, and in large numbers, are employed on federal and state emergency jobs, receiving a bare subsistence wage. Among these, there are many claiming to be skilled workers who for some reason or other continue to remain without employment for which they have been trained, even though they held responsible positions when decreased employment left them jobless.

It is true there are a number of industries which are almost on a boom-time employment schedule. From some of these bitter complaints are heard that there is a dearth of skilled labor, but there are also quite a number of industries which have experienced relatively little betterment in business conditions. Hence, it is difficult at this time to state just how much man power will be absorbed by the industries which are still below par when they again resume normal operation. Still more uncertain is it to predict what will or may happen in some of those industries in which improved or new materials, processes, and machines have been developed within the past few years, ready to be placed on the market just as soon as more favorable conditions are developed. Science and invention have not been idle in the thousands of industrial laboratories in our country, even during the years of depression. It is true that some of these inventions, many of them in fact, may be labor-saving devices which will seemingly still further increase the number of unemployed, yet experience has taught that each labor-saving device has been the source of not only greatly augmenting man power, but also increasing the opportunity for individual employment. It is, therefore, entirely too early to predict at the present time just how many millions will be permanently unemployed. Unfortunately, no one in America seems to be able to put the machinery of life back into the shape in which it was before it suddenly collapsed about seven years ago. Many have tried their hands at it with but indifferent success. The pendulum of time swings inexorably on and on, seemingly handing out to man what it wills, leaving employer and employee, financiers, economists, captains of industry, and business barons either on the pinnacle of success, or gasping — affrighted and broken. Then time, the healer, slowly patches up the broken lives and fortunes, and again lifts them up, as happened repeatedly in the past, to a higher plane of prosperity.

It seems that we are again slowly emerging from such a cycle of darkness and despair, and that may be one explanation why some people, still under the influence of fear, think that such a large army of unemployed will be a necessary part of our national life. It is not necessary, however, to look at this question entirely from the dark side. Business and industry are showing a promising degree of recovery. When all of the various fields have returned to their normal status, there will, no doubt, be some unemployment as there always has been and ever will be. Just how large this fluctuating army of the unemployed will be is hard to say. Most probably it will not be larger than it was during the past in normal times.

Whether it will be large or small, however, the problem that confronts the school, especially the school shop, is to prepare the youth of our land to fit into our industrial civilization. There is a niche for everyone, but each one must be fitted into his niche. The school is not confronted with the problem to train those who are to make up the army of the unemployed, but rather to train all for employability. It is not up to the teacher to preordain those worthy of the best type of training, and to let the rest shift for themselves. Everyone who enters school has the right and need to receive an education to the limit of his capacity. In this way, even those of small or inferior ability may receive enough education to fill a particular niche in life. Besides the small percentage of extremely gifted and extremely inferior students, there is that large number of normal or near-normal individuals who must be equipped with skills, aspirations, ideals, and ambitions that will make for better citizenship. In these, the school must develop a personality that will differ from the selfish, greedy, individual type who through their misanthropic selfishness have brought about the debacle from which we are now emerging.

The shop teacher of today is confronted with a task that is more sharply defined than it has ever been. It is time, then, for him to concentrate on the job before him. The student coming to him in the future will start his active working life at a later age than heretofore, and for most of the students, the active working life will be terminated sooner. There will be less and less men of 60 to 70 working in shop and factory. Our students then must be trained for exerting concentrated effort for shorter periods each working day. The working week, too, will most likely see considerable shortening as years go on. They must be trained to work with machinery and tools which are very much unlike those that past generations have worked with. That does not mean that the workman of today may be less skillful than the old-time workman. As a matter of fact, to the skill of the hand must be added the skill of using many special devices and machines which augment the efforts put forth by the old-time mechanic. Beyond this, however, the young must be trained for entry into an entirely new economic era. Just what will be the best method to accomplish all of this is difficult to say. It is this question, and many phases of this question, which the shop teacher has to study. It is this phase of the work to which attention must be paid rather than to be frightened by the ofttime repeated stories of the millions of unemployed.

The school shop offering woodwork and drawing only will find that it no longer can lay claim to fitting pupils for purposeful life situations. Shop teachers must recognize the tremendous advances made by industry and accommodate themselves to conditions as they are. Hastily conceived curriculum changes will most likely fail to disclose the correct solution. Studious, painstaking, scientific research alone can be relied upon to point out the direction in which to proceed.

Testing and Test

A GENERAL-SHOP TEST

Hugh Norris, Director of Industrial-Arts Education, East Central State Teachers College, Ada, Oklahoma

A test with key and norms that may be useful to others.

Name of Student.....Course.....
Time Beginning..... Score.....
Plus.....
Time Finished..... Total.....
Minus....
Time Used ..... Rank.....

NOTE: Time to be used on this test is 30 minutes. Each additional minute used will be taken from your score and will count one point, while each one less will be added to your score.

Sections and Values

(To be filled out by the teacher)

I. *Woods*
Possible score 15. Score made.....
II. *Hand Tools*
Possible score 25. Score made.....
III. *Electricity*
Possible score 5. Score made.....
IV. *Power Machines*
Possible score 10. Score made.....
V. *Wood Fastenings*
Possible score 5. Score made.....
VI. *Glues*
Possible score 10. Score made.....
VII. *Brazing and Soldering*
Possible score 5. Score made.....
VIII. *Wood Finishing*
Possible score 15. Score made.....
IX. *General*
Possible score 10. Score made.....
Total 100 per cent. Total.....

Score Norms

1st-semester students, the norm is a score of 76.

2nd-semester students, the norm is a score of 81.

3rd-semester students, the norm is a score of 88.

4th-semester students, the norm is a score of 91.

Projects made this term:

1. .....
2. .....
3. .....
4. .....

I. Woods

Place a T before each statement that you think is true, and an F before each that you think is false.

( ) In woodwork, we have before us these elements — the project, the material, and the tools used in shaping the piece of furniture. T*

( ) Regardless how old and dry a piece of lumber gets, there is always some moisture left in it, in this locality it is 12 per cent. T

( ) When a strong wood is needed, as for airplane struts, stepladders, and body works, white pine is used. F

( ) Lumber left to dry in the shade will crack to such an extent that it is about 50 per cent No. 1 grade. T

( ) Red gum is classified as soft lumber, therefore, it is useless in the construction of good furniture. F

( ) As a rule, it takes quartered oak two years longer to dry in the shade than it takes plain oak, walnut, chestnut, and the like. T

( ) A square of roofing material, regardless of the manufacture, will cover 100 square feet, or an area equal to 10 by 10 ft. T

( ) Hickory wood is used in construction where a soft wood is required. F

( ) The width, thickness, and length of lumber when it comes from the yard, are of full measure. F

( ) When subjected to constant wear, plain-oak flooring will last longer than quartered-oak flooring of the same grade. T

Select the right word, or phrase, and write its number in the parentheses as indicated. *Example:* (3) Handsaw handles are usually made from (1) plain oak, (2) sap gum, (3) applewood, (4) red gum.

( ) For an open-grain wood, I would select (1) chestnut, (2) red gum, (3) applewood, (4) yellow pine. 1

( ) The furniture that comes nearest to fitting in with all others is made of (1) maple, (2) walnut, (3) pine, (4) red cedar. 2

( ) The cheapest priced lumber for buildings is (1) red gum, (2) cedar, (3) mahogany, (4) yellow pine. 4

( ) A wood that is used in this shop that has to be imported is (1) poplar, (2) magnolia, (3) mahogany, (4) quartered red gum. 3

( ) Heavy-duty office furniture is usually made of (1) spruce, (2) white oak, (3) California redwood, (4) teakwood. 2

II. Hand Tools

Place a T before each statement that you think is true, and an F before each that you think is false.

( ) The best make of handsaws is hollow ground so as to prevent clamping or pinching when cutting a thick or wide board. T

( ) The ratchet on the breast drill and wood brace gives speed and a great deal of accuracy in boring a hole in wood or metal. F

( ) The countersink is used to lower the head of flat-head screws and bolts so as to have a surface, when puttied, ready for the finish. T

( ) A hand scraper when held at an angle of 45 deg. will not remove mill marks so quickly as when held parallel to them. F

( ) Wood files and metal files are made alike, and it doesn't make any difference on which material you use them. F

( ) Nail sets are not to be used as punches, therefore, they should not be ground off to a center point, but should be left cuplike. T

( ) In filing a handsaw, the operator should start at the heel and file alternate teeth toward the toe of the saw. T

( ) It is very dangerous to use a hand file on the lathe, without a good handle to protect the palm of the back hand. T

( ) It is a poor policy to clamp a board to the bench, or place it in the vise when using a chisel. F

( ) The principal parts of the hand plane are: Handle, knob, heel, toe, sole, throat, flank, frog, plane iron or bit, and cap iron. T

( ) For the best results in squaring up stock, the body of the framing square should rest against the edge of the board. T

( ) In making a paring cut with the chisel, the board should be held firmly with one hand and the chisel with the other. F

( ) The auger bit, near the size of the mortise, will aid the mechanic to a great extent in making a mortise joint. T

( ) There aren't any state or national laws regulating measuring instruments used in the school shop today. F

( ) According to their uses, chisels are designated as paring, firmer, and framing chisels. F

( ) The expansive bit is used in boring holes greater than 1 inch and can be adjusted to any fraction of an inch. T

( ) The best oilstones are known as the "Washita" and "Arkansas" and are natural quarried stones. T

( ) Where there are knots or cross grain in the wood, a scraper is used to put the surface in a near-perfect condition. T

( ) Rocking or holding the scraper at several angles while scraping gives the best results. F

( ) A standard quire of sandpaper contains 20 sheets. F

Place into the parentheses the word or words which should appear where the dash is used.

( ) When pulling a large nail, it is advisable to place a ——— under the head of the hammer to Block

*The key letter or word appears at the right of each test question.

prevent scarring the wood.

( ) The ——— alone and not the hammer, is used to drive a screw. — Screw driver

( ) In removing the mill marks, the best workman uses the ——— first, then the scraper, and finally the proper grades of sandpaper. — Plane

( ) The ——— is used to saw with the grain of the wood, while an inexperienced workman might use the cut-off saw through a mistake. — Ripsaw

( ) T bore a ⅜-in. hole, use a bit with a ——— stamped on the shank. — No. 6

III. Electricity

Place a T before each statement that you think is true, and an F before each that you think is false.

( ) Edison made the first successful generator to produce electricity in large quantities. — T

( ) A fuse inserted in an electrical circuit will increase the voltage. — F

( ) The moving part of an a.c. motor is called the rotor, and should never be referred to as the field coil. — T

( ) When a motor makes a humming noise at the beginning of the pick-up, it is a sign that it is running well, and that all connections are perfect. — F

( ) Most auto storage batteries are of the 8-volt type, therefore, they are strong enough to turn a motor of that many cylinders. — F

IV. Power Machines

Place a T before each statement that you think is true, and an F before each that you think is false.

( ) The careless workman who violates the laws of a machine will have to pay for each act in the course of time. — T

( ) In the school shops of today, there are many machines that are designed for one-armed and left-handed workers. — F

( ) Most workmen consider it safe to make adjustments on a machine while it is in operation, thereby saving time and expense. — F

( ) Usually there are three things that cause a band saw to break: A dull saw, feeding too fast, and attempting too short a turn. — T

( ) Boards, blocks, and end-grain surfaces under 8 in. should not be run over the jointer. — T

( ) The jointer knives are the best means to use in removing dried glue from glued-up stock. — F

( ) There are round heads for jointers on the market that have three knives. — T

( ) All belts should be dressed off with some kind of belt dressing to prevent heating of the pulley and wearing out the belt. — T

( ) All switches should be well pushed in, and all connections well made for the best results in operating a machine. — T

( ) Both rear and front tables of the jointer should be adjusted for deeper or shallower cuts before turning on the power. — F

V. Wood Fasteners

Place a T before each statement that you think is true, and an F before each that you think is false.

( ) Carpenter's wax, oil, grease, or soap will aid the workman in driving screws or nails into hard wood. — T

( ) The first figure on the end of a screw box indicates the length of the screw, the next the size of the wire used in making the screw. — T

( ) Nails, when clinched, should be bent with the grain of the wood when you wish them to hold fast. — F

( ) Round-head screws should never be countersunk. They are to be left natural so as to give beauty, as well as strength to the project. — T

( ) A dowel is used to fill up holes that are made by mistakes in the construction of the project. — F

VI. Glues

Place a T before each statement that you think is true, and an F before each that you think is false.

( ) Oiling the wood where it might become soiled by misplacement of glue is a poor policy, and should be discontinued. — F

( ) All surplus glue should be removed, starting about five minutes after the glue is misplaced, with a sharp chisel or other instrument. — T

( ) For the best results in preparing glue, one should soak it over night and make new glue each day. — T

( ) There are a number of liquid glues on the market ready for use, and their holding strength is greater than properly cooked glue. — F

( ) End grain, when gluing, should be sized with a thin coat of glue before applying the regular coat of glue. — T

( ) Most any flat varnish or paint brush, of small size, makes a good glue brush for applying liquid glues. — T

( ) It is advisable to use a small stick or splinter in applying glue to small articles, mortises, etc. — T

( ) In regluing a project, all the old glue must be removed if the best results are expected, as glue will not stick to glue. — T

( ) Continued heating will decompose gelatine and render glue valueless, therefore, fresh glue should be prepared each day. — T

( ) Rubbing glued boards together before clamping does not aid the holding qualities of the glue. — F

VII. Brazing and Soldering

Place a T before each statement that you think is true, and an F before each that you think is false.

( ) To hammer the kinks out of a band saw, it is a good plan to use a regular carpenter's claw hammer and the anvil. — F

( ) It is advisable for one to be careful and not let the fingers touch the parts to be brazed or soldered. — T

( ) The acids that are used in most shops for soldering are hydrochloric, or muriatic cut with zinc or tin. — T

( ) The white powder used in brazing is to aid the operator in seeing the silver flow when melting or fusing. — F

( ) Parts to be soldered should be warmed before attempting to solder, otherwise your efforts will fail many times. — T

VIII. Wood Finishing

Place a T before each statement that you think is true, and an F before each that you think is false.

( ) A paste wood filler should be well worked into the pores of open-grain wood before the final finishes are put on. — T

( ) In the selection of finishes, one should keep in mind the finishes of the furniture that the project is to be placed with. — T

( ) Wood fillers have very little to do when it comes to finishing open- and closed-grained woods where the temperature is above 85 deg. F. — F

( ) Stains made from the volatile oils spread over the surface easily, penetrate deeply, and are very transparent. — T

( ) Spirit stains have nothing to do with alcohol, they are made of certain oils mixed with aniline colors to the desired shades. — F

( ) Water stains have a tendency to raise the grain of the wood, therefore, the surface to be stained must be sponged with water first. — T

( ) Water stains are easily applied, you do not have to work fast, or attempt to cover the whole surface at once. — F

( ) Boards from different trees of the same species will finish alike when the stains are applied and wiped off. — F

( ) Alkalis and acids are used as mordants with aniline colors to make them adhere to the wood and to prevent fading in color. — T

( ) Volatile oil stains, spirit stains, and water stains are used to protect the surface of the wood and to give it the proper color. — F

( ) It is best to let all stains dry at least 24 hours before applying fillers, varnishes, shellac, wax, etc. — T

( ) The best results can be obtained without the aid of the plane, scraper, and sandpaper, when it comes to proper finishing. — F

( ) Various pastes and liquid fillers are made from corn starch, whiting, plaster of paris, and silex. — T

( ) Silex is a filler made from certain rocks ground and mixed with oils, and is considered the poorest of wood fillers. F

( ) For the best results, wood fillers should be colored the color of the stain before applying to the project. T

IX. General

Place a T before each statement that you think is true, and an F before each that you think is false.

( ) A piece of lumber 1 in. thick, 12 in. wide, and 12 in. long contains 1 board foot of lumber in all regular lumber yards. T

( ) A heavy oil serves a stone better than a thin grade. It helps to hold the work pieces of metal and dirt in the pores of the stone. F

( ) It is the general practice for lumber dealers to quote prices for thickness of less than 1 inch by the square feet of surface. T

( ) A skilled workman will consider the material and project with the tools that he has to work with in his shop. T

( ) Cutting with or against the grain of wood, any of the tools in the workman's tool kit will do the work satisfactorily. F

( ) The general order of procedure in making a project is to select the materials, choose your tools, and then state your problem. F

( ) The first figure in ordering a bill of lumber indicates the thickness, the second the width, and the third the length. T

( ) In sawing a board off accurately, the face of the board should be run over the jointer so the pencil marks may be visible to the workman. F

( ) After the working edge and working face of a board are planed at right angles to each other, the corner should be marked. T

( ) The miter joint, when fastened with a spline, makes one of the best methods of fastening a corner to a picture frame. T

Problems and Projects

UNIT PROJECTS IN MECHANICAL DRAWING

W. A. DeVette, Erie, Pennsylvania

(See Supplement No. 343)

It has been the experience of the writer that pupils in drafting classes can be given instruction much more effectively by using projects which are complete units in themselves than by the use of a series of unrelated machine parts.

Related information has a much greater meaning when presented in reference to a problem such as the form punch and die, presented in this article.

The problem as a whole becomes more interesting when it has a mechanical significance which the student can grasp.

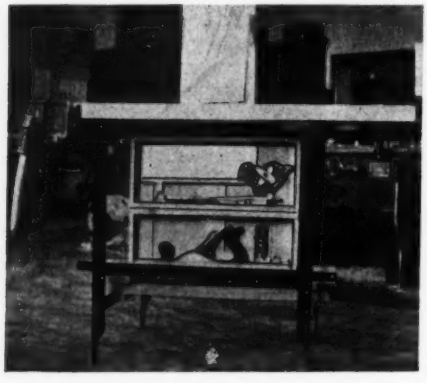
Such problems are suitable for trade-drafting classes as well as for related drafting for patternmaking and machine-shop pupils. Not infrequently these problems can be used even in the shop.

The use of this type of problem also facilitates the work of the instructor who assigns his pupils' work on the basis of individual differences, rather than holding to group instruction which is so difficult in most drafting classes.

BENCH TOOL HOLDER

John Worthington, Timmins, Ontario, Canada

The accompanying illustration shows a bench tool holder designed to fit benches with angle-iron legs and metal bracing.



The trough or slide, fits between the legs of the bench, and is held in place by tension, that is, the slide is sprung into position between the metal cross bars on each side which then pinch tightly against the two battens. The inside corners at the ends of the slide are beveled back about 2 in. to permit the tool box to enter easily.

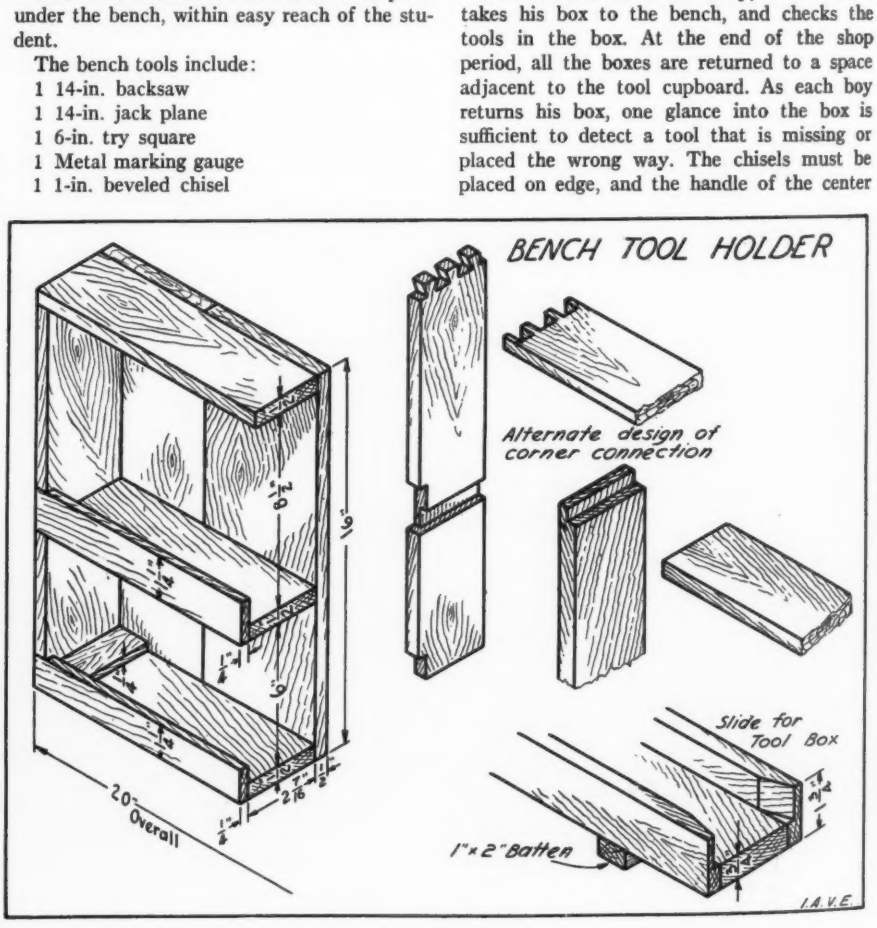
The illustration shows the tool box in place under the bench, within easy reach of the student.

The bench tools include:

1 14-in. backsaw
1 14-in. jack plane
1 6-in. try square
1 Metal marking gauge
1 1-in. beveled chisel
1 ½-in. beveled chisel
1 ¼-in. beveled chisel
1 Rule
1 Marking knife

The tool boxes are painted a French gray. Black numbers, corresponding to the numbers on the bench, are painted on the boxes. The chisels and other tools are all marked with the number corresponding to the box to which they belong.

As the class enters the shop, each student takes his box to the bench, and checks the tools in the box. At the end of the shop period, all the boxes are returned to a space adjacent to the tool cupboard. As each boy returns his box, one glance into the box is sufficient to detect a tool that is missing or placed the wrong way. The chisels must be placed on edge, and the handle of the center



one must be opposite to the others. This prevents rubbing the cutting edges together. The try square fits behind the handle of the jack plane. The backsaw is held in place with a turn button.

This method of taking care of the bench tools has worked out very satisfactorily. It has eliminated the confusion usually encountered when tools are given out and returned, and has resulted in the saving of considerable time. It also has made it necessary for each student to keep the cutting edges of his own tools in working condition, thereby getting sufficient practice in sharpening and conditioning tools. It also possesses the advantage that any interchange of tools may easily be detected. The tool holder also helps to keep the top of the bench clear for the work that is to be done upon it.

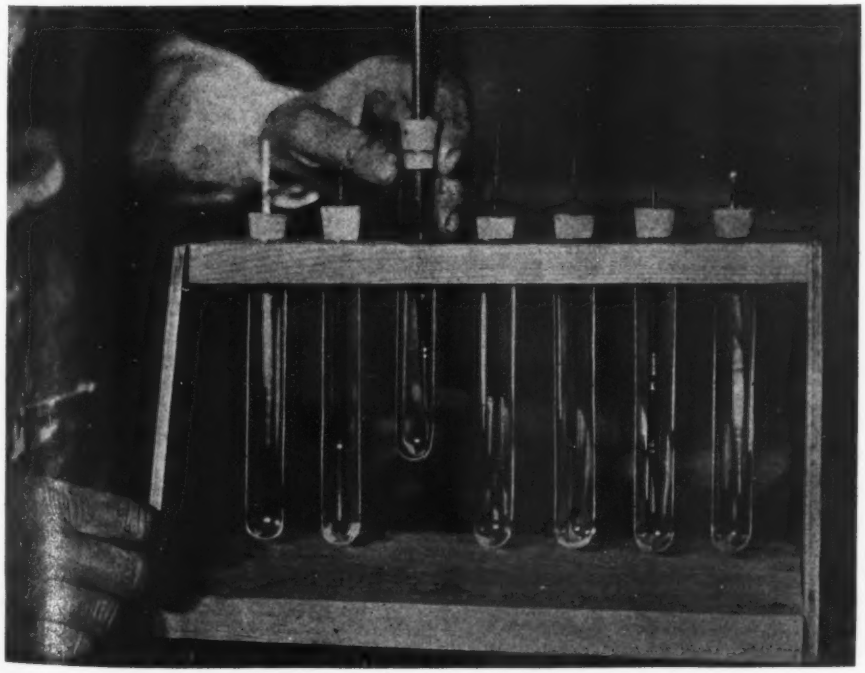
RACK FOR SMALL BRUSHES

D. C. Marshall, Manhattan Junior High School, Manhattan, Kansas

Caring for brushes is a job that is often neglected, and while there have been many kinds of brush containers developed, there has never been anything done for the little ones — the trimmers, pencil brushes, and other small ones so necessary for painting toys and getting into small places where the big brushes will not go. The handy container described and illustrated herewith will keep the small brushes ready for use. It costs so little that the saving in brushes soon pays for it.

The materials needed are a few scraps of wood, a test tube for each brush, and corks to fit the test tubes. The rack is made after the fashion of the ordinary test-tube rack with a wide base that will not tip over easily. The holes are bored so that the tubes fit tightly, as it is not desirable that they come out easily.

When the rack for the tubes has been finished, the corks are drilled to fit the handles of the brushes tightly. The corks must be slipped on the handles far enough so that the bristles will not touch the bottom of the tube. Turpentine is used to keep the brushes soft. When using a brush, the cork is left on the handle so no time need be wasted trying to find which cork fits a particular brush. The solvent is not wasted by evaporation as the corks keep the tubes air tight. Such a brush rack is a most handy piece of equipment for any shop whether it is the school or the home workshop.

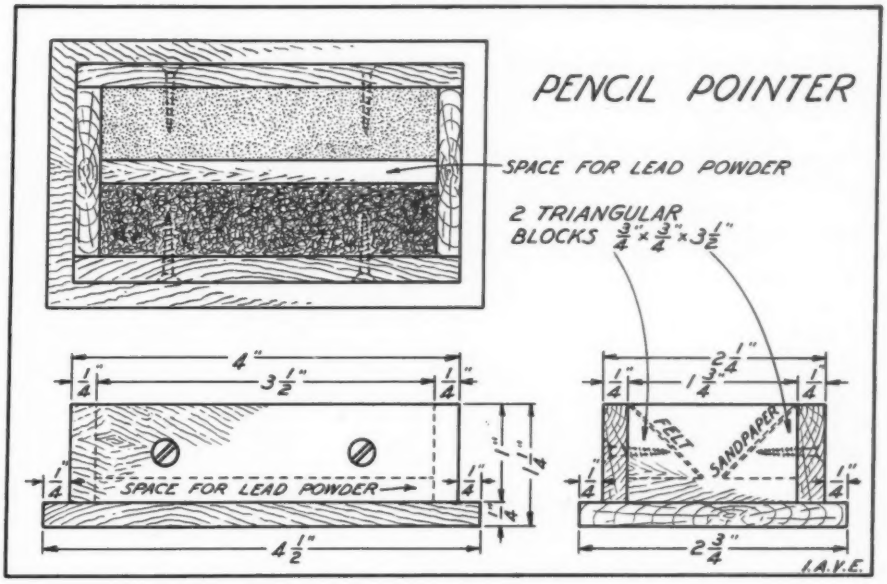


Small brush holder designed by D. C. Marshall, Manhattan, Kans.

PENCIL POINTER

Clyde Thorp, Vocational Arts Department, Public Schools, Benton Harbor, Michigan

The sharpener described and illustrated herewith has been found very efficient and handy. It insures a sharp pencil and clean fingers and drawings. It consists of the box and two triangular blocks held in place with screws. One of these blocks is covered with fine sandpaper, and the other with felt. The lead pencil is sharpened on the sandpaper and then wiped off on the felt, the lead dust falling to the bottom of the box where



Pencil pointer designed by Clyde Thorp, Benton Harbor, Mich.

it collects. After several months, the blocks may be removed to be refaced with new sandpaper and felt. At this time, too, the entrapped lead dust may be removed.

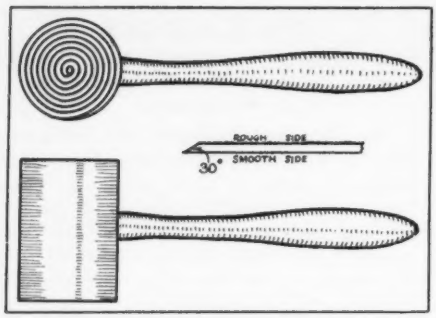
The sandpaper is glued into the blocks, and the felt is fastened in place with shellac.

The box should be finished with shellac or varnish, and then waxed to keep the lead dust from getting into the grain of the wood.

MALLETS FROM OLD BELTS

Walter C. Van Buren, Medina High School, Hampton, Virginia

Old belts, which have become too short by repeated breaking and patching, generally are thrown away by most shop instructors. These old belts, however, need not be discarded but can be put to good use in the shop. Mr. John Fontana, metal-shop instructor at State Teachers College, Buffalo, New York, has found a use for them. He simply coils up a section of an old belt, inserts a wood handle, and thus produces an excellent leather mallet. These mallets are used principally in the art metalwork, but they also will be found useful in the general shop, woodshop, or printshop. These mallets can be made in almost any desirable size to suit any particular job,



Leather mallet

depending on the size of the belting available.

To make one of these mallets, select a 12-in. piece of old leather belting that is still in good condition. Cut a taper of about 30 deg. on one end, running from the smooth side to the rough side, holding the rough side up. Starting with the end that is tapered, roll the belt tightly until it is of the desired diameter. With a 2-in. belt, a diameter of 1½ in. will be found suitable for most work. Cut off the surplus leather and unroll the belt.

Skive the outer end of the belt, so that when it is again rolled up, the outside diameter will be as near a perfect circle as possible. Place a small amount of cement along the rough side of the leather and roll it up again as tightly as possible. Wind a strip of iron wire around the roll to hold it while the cement dries. A few thin wire nails about 1 in. long, if driven into the roll where the end of the leather comes, will also aid in keeping it together.

A small space will be left in the center of the roll of leather where it was started. Cut a few small slivers of leather off the part that was left, place cement on each, and force enough of the small strips into the space until the center is solid. A handle about 8 in. long can be turned on the lathe from any reasonably hard wood. Drill a hole of the proper size in the center of the roll of leather, and drive the handle into the hole. The end of the handle may be split, and a small wedge driven in if desired.

WATER STILL FOR BATTERY AND SCIENCE PROBLEMS

Herbert C. Phelan, Pine Manual Training School, Ansonia, Connecticut

The author found it necessary to construct a water still to furnish pure water for storage-battery use and also to supply distilled water to be used in the science classes.

In checking over the discarded parts, an old model 4-90 Chevrolet gasoline tank was salvaged and cut to a length of 16 in., to be used as a cooling tank. A ¼-in. hole was drilled in the closed end or bottom of this tank, to permit the lower end of the copper cooling coil to protrude. Three inches from the top of the tank, another ¼-in. hole was drilled to allow a 3-in. length of ¼-in. copper tubing to be soldered as an overflow drain. Four inches from the bottom of the cooling tank, another ¼-in. hole was drilled to allow a 3-in. length of ¼-in. copper tubing to be soldered as a supply pipe for water replenishment to boiler or steamer. All parts were carefully tinned to reduce the chance of contamination.

The steamer was made out of a model T Ford gasoline tank. This was cut with the hacksaw to a length of 12 in. Then the top of the steamer was made of 21-gauge sheet iron, 10¾ in. in diameter. A ⅜-in. hole was

drilled in the center of the top for the water inlet, and 4¾ in. from this a ¼-in. hole was drilled for the copper-tubing steam outlet. The cover can be soldered in place, but it is recommended that it be welded in position with the electric arc. A fuel line was removed from an old chassis of an automobile, then annealed and formed into a series of 4-in. coils with 2 7/16-in. pitch. The full length of this tubing is 15⅞ in. This coil was then soldered in position in the cooling tank. The short 3-in. lengths of ¼-in. copper tube are then soldered into position, and the short length of ⅜-in. tube has a drain cock soldered into one end to control admission of water into the steamer. This, too, is soldered into place. The tank suspension straps were made of 1/16 by ¾-in. strap iron. The tin support which holds the upper part of the coil in position was then soldered in place.

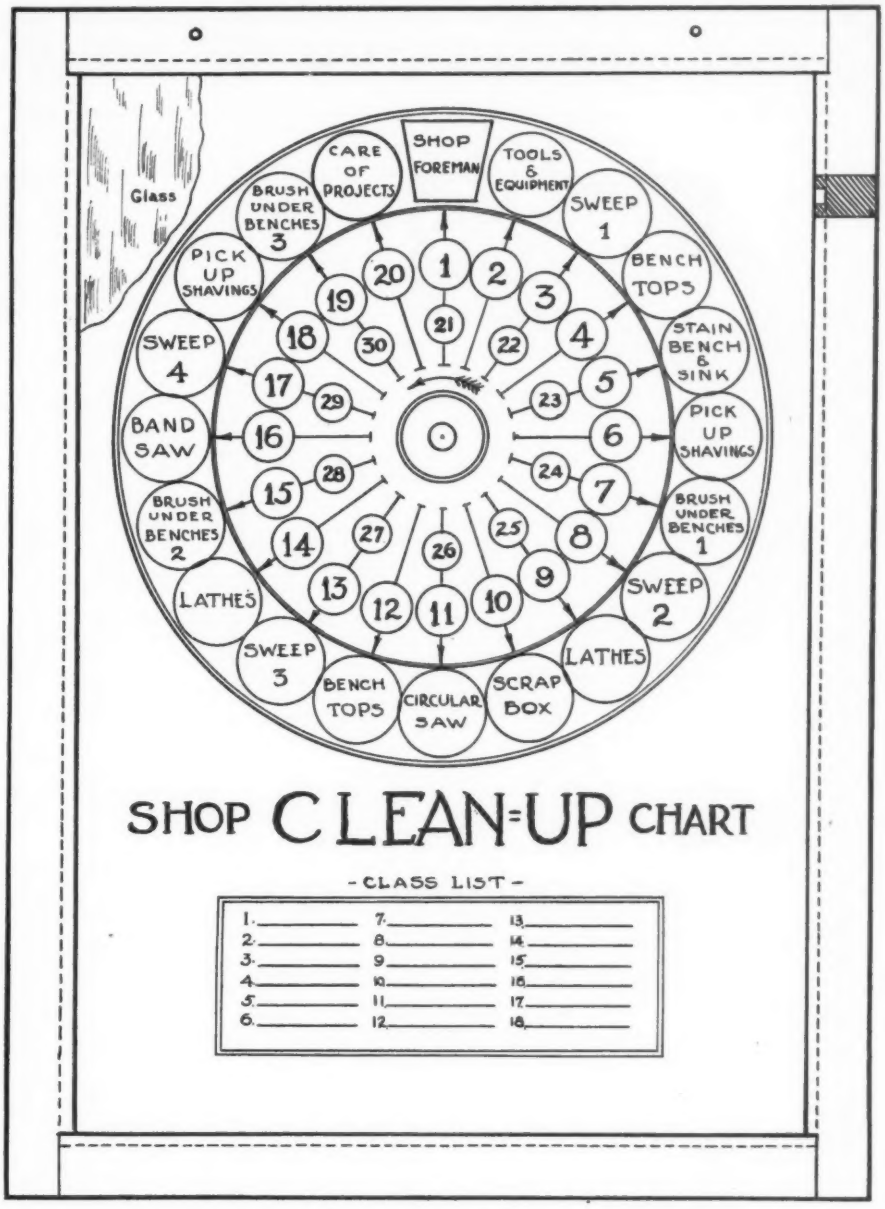
Heavy rubber hose is connected to all copper tubing. Water is placed in the steamer to the half-way mark. Then the gas plate is lighted, and when the steam starts to generate, the water flow through the cooling tank is regulated to condense the steam flowing through the coiled tube. As the steam vapor is cooled, it is converted back into the liquid state and deposited in the container set beneath the coil. The approximate capacity of this still is one gallon per hour.

SELF-ASSIGNING CLEAN-UP CHART

Deane E. Eldridge, Director of Industrial Arts, Plymouth, Massachusetts

The assignment chart described in this article seems to meet all arguments for and against the clean-up problem. It is fair, it takes care of large and small groups, and once it is made out it becomes self-assigning, requiring only an instant to make the change. The instructor finds himself free at the end of the period to attend to such duties as grading the day's progress, or preparing for the coming class because the shop is being put in order by the pupils, under pupil supervision. The constant changing of the clean-up duties with always a shop foreman in charge, helps to find those boys who can "lead" and those who had "rather be led."

The construction of this clean-up device is not difficult and the time spent making it is more than repaid after it has been put into use. It is necessary to analyze the shopwork to determine the jobs which go toward making for an orderly shop. Such jobs as sweeping, caring for machines, and bench tops should be divided between several boys. Other jobs may seem so simple that two or more may be grouped together. The size of the class must be considered and the chart made accordingly. No one chart will suffice for every shop, since the conditions vary in different places. The size, 16 by 22 in., is convenient to handle and the lettering is sufficiently large to be read at a good distance. The inner circle including the pupils' shop numbers, is cut through the wallboard on which the chart is drawn thus allowing it to revolve. Overhanging clips made from small scraps of wallboard are glued to the back of the chart to prevent the disk from dropping out. The revolving of this inner disk changes every job on the chart. When the chart is complete it is mounted in a frame behind glass and becomes a serviceable piece of the shop equipment.



Clean-up chart submitted by Deane E. Eldridge, Plymouth, Mass.

In the rectangular opening at the bottom of the chart is inserted the card containing the class list. This is quite necessary for the foreman whose duty it is to supervise the work. As the enrollment changes new cards can be printed without injury to the chart.

There are two questions which arise in the using of this device. How does it take care of classes larger or smaller than the number it is designed to care for, and how does it function in case pupils are absent? In classes larger than twenty pupils, extra numbers are inserted in the chart to take care of the pupils who have high numbers. This means that these pupils are merely helpers for some others whose number is a smaller one. In small classes it is a practice to have the "left-over" jobs done by those whose numbers are directly across from these jobs. Absent pupils also may be taken care of by the pupils opposite those absent. This is the only real weakness in the chart, but this way handles the problems very effectively.

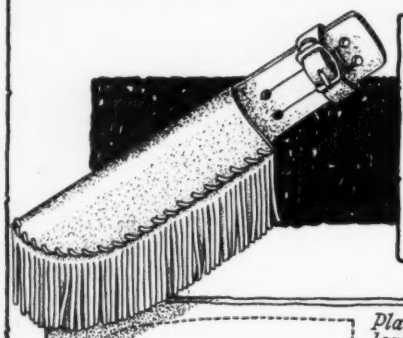
Of the several methods which the writer has observed in the various school shops, this one seems to be superior. It is definite in its assignment and offers a ready check on any task poorly done. It acquaints the boy with every nook and corner of the shop and helps him to appreciate the work that is necessary

(Continued on page 259)

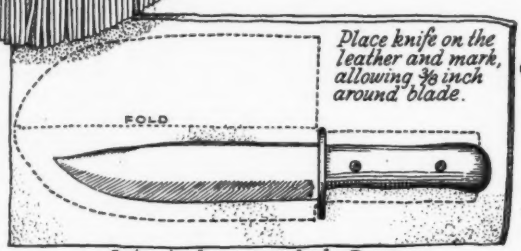
KNIFE SHEATHS

AX SHEATHS

Sheaths should be made of rather stiff leather. Cowhide or thick calf skin is best, and should be about 1/16 inch thick. For lacing use thin leather shoe laces, or cut it of thin leather about 1/8 inch wide. Use a leather punch if you have one or make one by filing off the end of an 8 or 10 penny nail depending on the size of the lacing. Lacing should fit snugly into the holes.

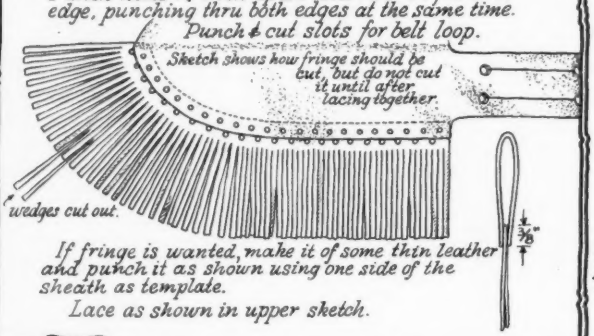


Place knife on the leather and mark, allowing 3/8 inch around blade.



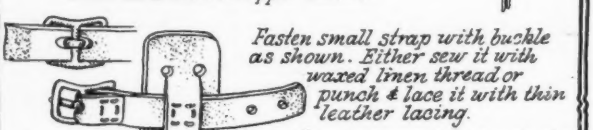
Cut out where marked. Dampen leather with water and fold.

Punch holes 1/4 inch apart and 1/8 inch from the edge, punching thru both edges at the same time. Punch & cut slots for belt loop.



If fringe is wanted, make it of some thin leather and punch it as shown using one side of the sheath as template.

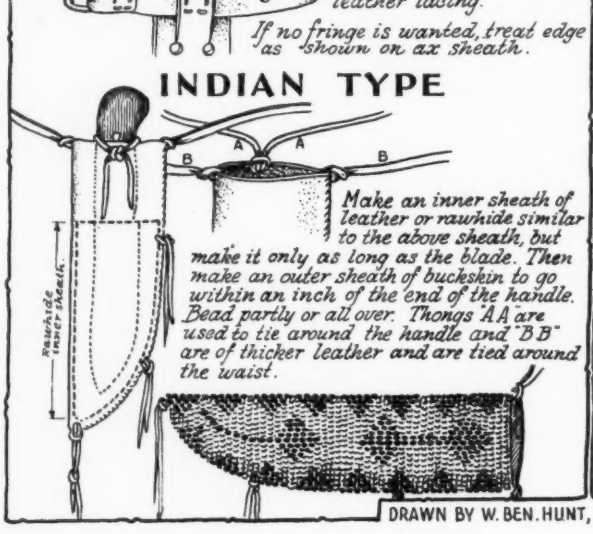
Lace as shown in upper sketch.



Fasten small strap with buckle as shown. Either sew it with waxed linen thread or punch & lace it with thin leather lacing.

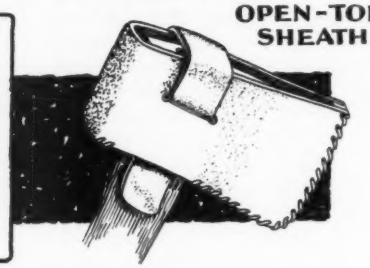
If no fringe is wanted, treat edge as shown on ax sheath.

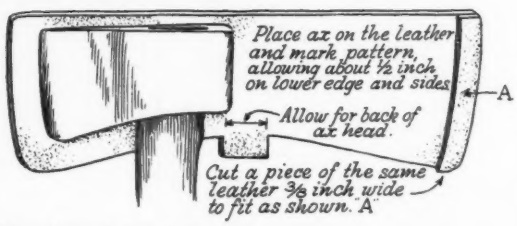
INDIAN TYPE



Make an inner sheath of leather or rawhide similar to the above sheath, but make it only as long as the blade. Then make an outer sheath of buckskin to go within an inch of the end of the handle. Bead partly or all over. Thongs "A A" are used to tie around the handle and "B B" are of thicker leather and are tied around the waist.

OPEN-TOP SHEATH

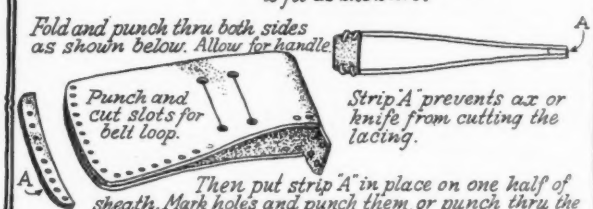




Place ax on the leather and mark pattern, allowing about 1/2 inch on lower edge and sides.

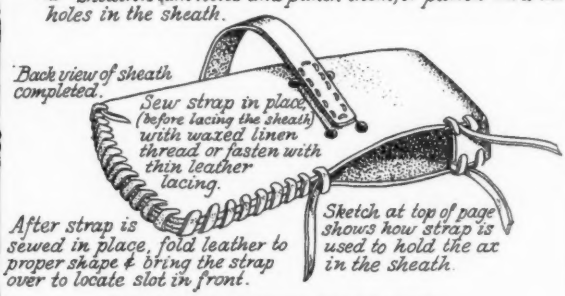
Cut a piece of the same leather 3/8 inch wide to fit as shown. A

Fold and punch thru both sides as shown below. Allow for handle.



"Strip A" prevents ax or knife from cutting the lacing.

Then put strip "A" in place on one half of sheath. Mark holes and punch them, or punch thru the holes in the sheath.

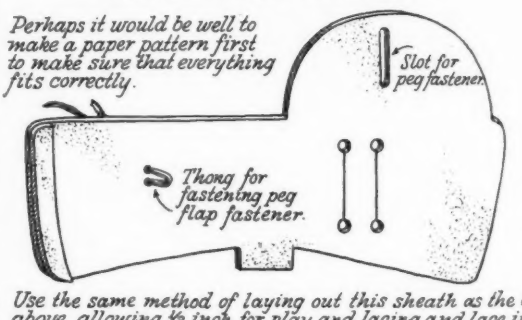

Back view of sheath completed.
Sew strap in place (before lacing the sheath) with waxed linen thread or fasten with thin leather lacing.

After strap is sewed in place, fold leather to proper shape & bring the strap over to locate slot in front.

Sketch at top of page shows how strap is used to hold the ax in the sheath.

CLOSED-TOP SHEATH

Perhaps it would be well to make a paper pattern first to make sure that everything fits correctly.



Use the same method of laying out this sheath as the one above, allowing 1/2 inch for play and lacing, and lace it the same way.

A good snap fastener may be used to lock the flap but a more woodsmanlike method would be as shown here.

Whittle peg of hardwood and make it a little shorter than the slot. Fasten with a piece of thin lacing.

DRAWN BY W. BEN. HUNT, HALES CORNERS, WIS.

(Continued from page 257)

to keep a shop presentable. Such a chart may be adapted readily to any type of shopwork, in fact, to any kind of work where individual duties are assigned. The pupils are quick to realize the fairness of this system, and a great burden is lifted from the instructor when he feels that this part of the shopwork is put on a co-operative basis.

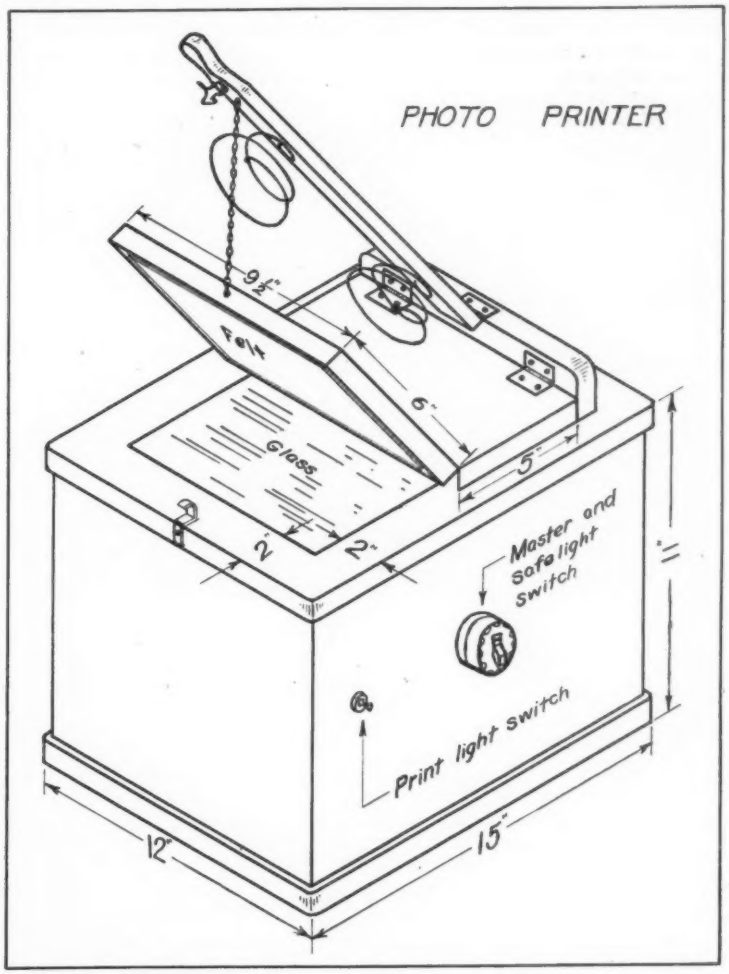
PHOTO PRINTER FOR THE SCHOOL SHOP

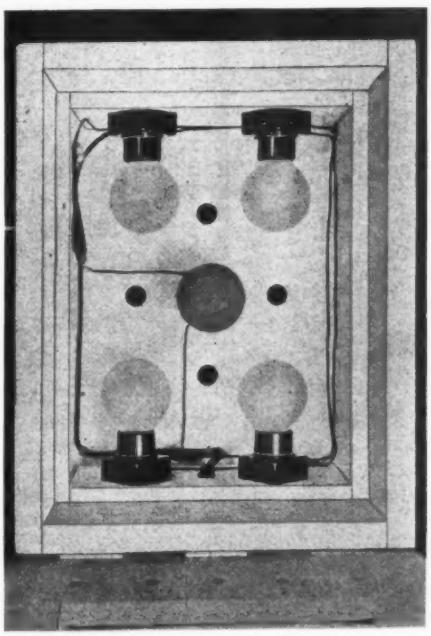
Leland A. Benz and Lawrence F. Simmering, High School, Ames, Iowa

The time of single-activity shops is rapidly passing. To woodwork has been added electricity, metalwork, and other units. Generally speaking, little consideration has been given to the merits and educational values of photography, although there are great possibilities in photography as a unit of work for the general shop. In establishing a course of photography in the ninth-grade general-shop class, the writers found it desirable to have a printer that would be adequate for the classwork. Although improvised frames or printers can be used quite successfully, it was found that the printer here shown was much more successful because valuable class time was saved by its use, thus enabling the class to turn out more work. Besides this, the monotony, tediousness, and waste of time spent in fastening and unfastening the improvised printer frames were eliminated. The printer described here, having practically all the advantages of a commercial printer, was found to cost very little.

The necessary parts are the box, the lighting system, and the printing frame. The overall dimensions should be approximately 12 by 15 by 11 in. A shipping box may be used, or better yet, the box may be constructed from plywood or any inch material. The dimensions can be altered to suit the individual needs. It is desirable to have the box of such construction that the inside is easily accessible. This can be done by hinging the bottom, hinging the top, or by cutting a door in the side.

The printing switch may be either one of two types, namely, a small switch on the side or a contact switch which closes with the lever on top. The switch on the side may be either a small toggle switch or a small push-pull automobile switch. If a contact switch is desired, an automobile stoplight switch will serve the purpose very well. The plunger arm of the switch is extended through the top in such manner that the circuit is closed when the lever is brought down. A main switch is used to control the entire system. One 25-watt ruby safe light and four 30-watt inside-frosted lamps are used. The hookup is shown in the diagram.

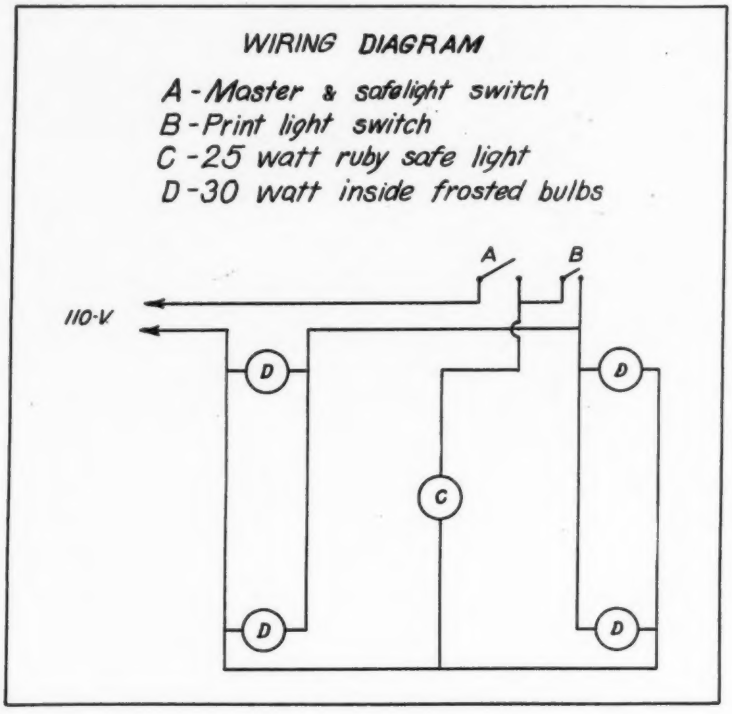




To properly diffuse the light, it is desirable to locate a piece of frosted glass about 3 in. from the top of the box between the bulbs and the printing frame. The frosted glass may be purchased, or it may be made from a piece of plain glass by sprinkling carborundum grit on it and rubbing with another piece of glass. Alcohol may be used to keep the carborundum between the surfaces of the glass.

A hole, the desired size of the printing frame, should be cut in the top of the box. This should be routed out to hold a piece of clear double-strength glass flush with the top. The glass should fit snugly and may be secured with either adhesive or friction tape. The cover for the printing frame should be made in two parts and hinged together as

shown, in order that the negative can be centered or masked and thus held in position. Cover the bottom of the cover with a thickness of felt. The lever used to raise and lower the cover has attached to it two springs and a catch which holds the cover in position while printing. For the spring, an old coil from a bed spring or car cushion may be used. The spring is cut in half, the end bent at right angles and held in position by staggering small screws on both sides of the wire.



The catch is a small cupboard catch which automatically engages itself when the lever is brought into position. When raising the lever, the forefinger disengages the catch from below.

At least six holes should be drilled in the bottom of the printer to give proper ventilation. Rubber feet may be used to hold the printer up from the table.

The inside of the box should be painted with two coats of white enamel to reflect the light. The outside may be stained to give a commercial appearance or, in keeping with the darkroom, may be given two coats of flat black paint or a coat of a mixture of lampblack and shellac.

A REMINDER FOR THE SHOP TEACHER

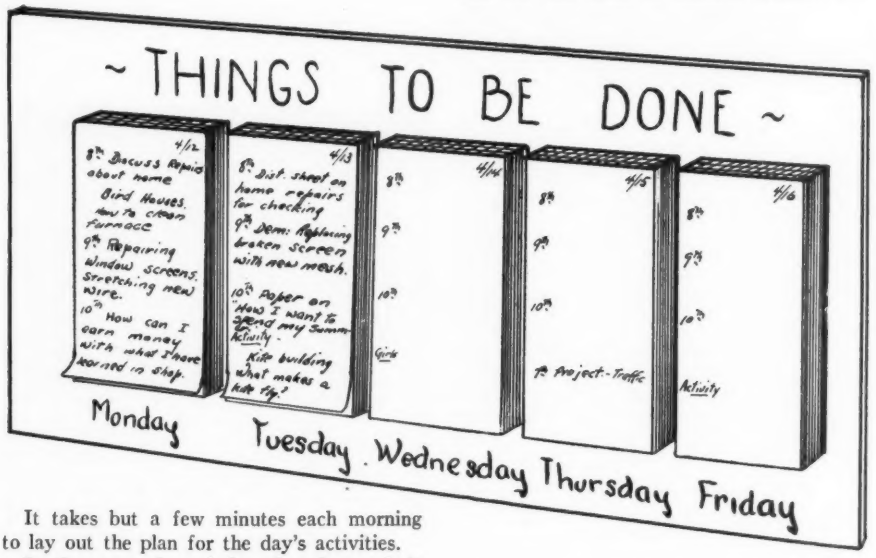
J. Edward Bond, High School, Oyster Bay, New York

Most shop instructors today have fairly heavy schedules and it is usually necessary for each day's work to be planned at home the night before and sometimes a week in advance.

The first class of the day comes in and the teacher is ready, notebook open, to begin his day's work. Often the teacher does not have a spare moment to get set for the next class before it is upon him. Precious minutes may be lost in closing out the class just dismissed and opening the new one.

To assist in overcoming this difficulty the writer has employed the reminder, illustrated herewith, which is very simply constructed, can be hung on the bulletin board, and affords an easily available check on work covered.

Five small 3 by 5 in. pads are glued approximately three quarters of an inch apart on a stiff cardboard backing.



It takes but a few minutes each morning to lay out the plan for the day's activities.

In the case of reminders for classwork it has been found advisable to enter the items each day and not the whole week's work on a Friday or a Monday. By getting in the habit of preparing the daily plan or schedule each morning an interest is aroused in the pupils which is most desirable, and reactions are often forthcoming which are very refreshing.

For example, in the illustration, notice on Monday's pad, 9th grade: "Repairing window screens," and "Stretching new wire." Two boys, during the class period, are heard discussing the instructor's talk. "What does he mean about that way to stretch the wire?" asks one.

"I don't know," is the reply, "why don't you ask him?"

"Come on," is the reply, and over they come.

"Could you tell us more about that screen business, Mr. Bond?"

"How do you mean, Frank?" I ask.

"Stretching the wire."

"Would you like a demonstration tomorrow?" I inquire.

"Gee, sure. I could bring a frame, but I haven't any wire."

"I'll get the wire. All you have to bring is the frame."

"All right, Mr. Bond, gee, thanks."

Tomorrow's demonstration is settled, two boys are feeling good, and although something has already been planned for the next day, that can wait. Today I have sold something. That something is interest.

On Friday of each week the slips for that week may be removed from the pads and filed away for future reference. For this purpose they are invaluable.

Tests can be built around so many days' work or so many weeks' work.

Notebooks when handed in periodically, can be checked against a tabulation of the slips.

The plan provides a system which will not permit forgetting those things which must be done. If, for example, two or three pupils are sent to the shop to work on part of a unit for the class in General Science, that unit is mentioned on the slip for the day those pupils are due, and each following day till the job is done.

Odd repair jobs, which always seem to find their way to the school shop are, with the help of this device, kept moving because they are

staring the instructor in the face every day until they are finished. If they are not done by the end of the week, they are moved on the reminder into the next week.

It is wise not to have too many jobs of this type on the list at one time. The writer limits the quantity to three and tries to keep that many moving all the time. This method takes care of the *odd jobber* with which every industrial-arts class seems to be blessed; that boy will not start and finish a job of his own but delights in helping some other boy, and who will work like one possessed to make something for Mr. Brown or Miss White.

Lists of repairs to tools, sharpening assignments, may also be entered. In fact the uses of this device are unlimited.

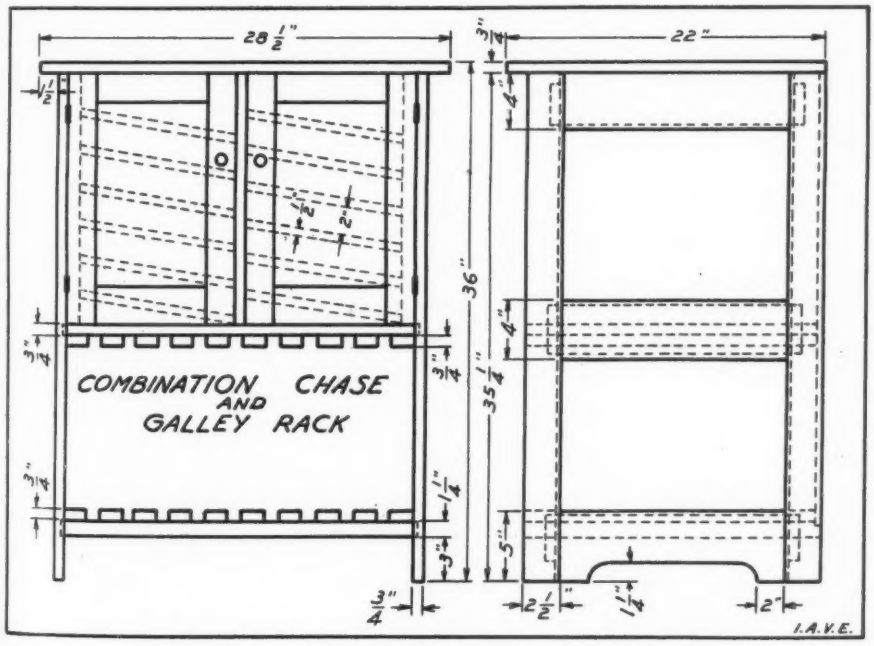
COMBINATION CHASE AND GALLEY RACK

Fred W. Bergmann, Cramer Junior High School, Camden, New Jersey

This useful piece of printshop funiture was designed to meet a definite need in a school printshop, which, for economy's sake, could not be quite fully equipped. It is now entering its twelfth year of constant daily use and is still rigid and strong.

The lower shelf can be placed at any distance from the floor to accommodate the size of the chase used in the shop. The chases are spaced far enough apart to prevent damage in case work is to be left "locked up."

The paneling can be made of any suitable paneling material available, that is, wallboard, masonite, plywood, and the like.



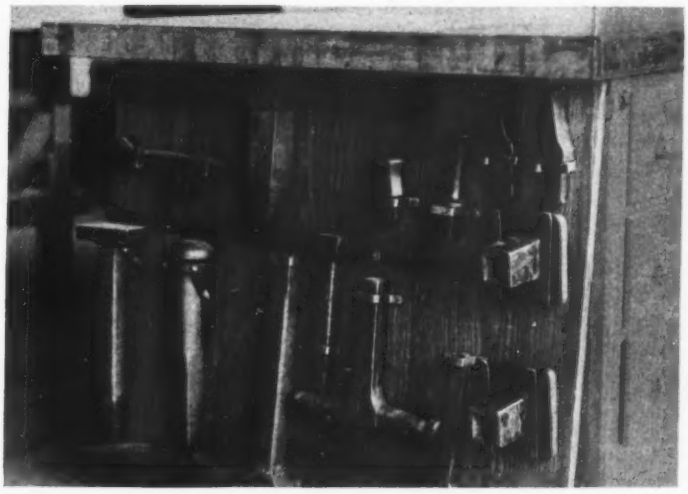
Chase and galley rack

The original case was made entirely of poplar. Number 12- by 2-in. r.h.b. screws were used to strengthen the joints between sides and shelves. The top was fastened with No. 12 by 2-in. f.h.b. screws, counterbored and plugged to make a smooth top.

TOOLS STORED WHERE USED BEST

J. Edward Bond, High School, Oyster Bay, New York

How many, many times we have had to walk way across the shop to get some necessary tool which could have been so easily placed permanently close at hand.



Special tool rack

Stakes are used on the stake bench and so they should be placed there at the scene of action.

With a bit of figuring and two or three active lads the rack illustrated may be constructed easily. The matter of pitch, to allow for balancing the various shaped tools in their proper places was figured by eighth-grade boys who had just completed their first week of shop experience. The same boys designed the tool hangers based on the weight and size of the tools to be hung.

The rack, which is hung on the end of the stake bench, is guarded by the overhang of the bench top which acts as a safeguard to busy boys hurrying past, who might otherwise brush against the tools.

To facilitate the return of the tools to the proper place on the rack when they have been used, the outline of the tool is painted in bright red on the panel.

INTERESTING FACTS REGARDING SOLDER

James C. Shaw, Chicago, Illinois

Solders that are made only of tin and lead in the various mixtures or alloys are known as soft solders. These soft solders have melting points ranging from 358 to approximately 500 deg. F., depending on the amounts of lead and tin which they contain. Contrary to the general opinion, lead, which is a soft metal, has a higher melting point than tin, which is a comparatively hard metal. The melting point of tin is approximately 450 deg. F., while that of lead is 620 deg. F. In alloying these two metals for soft solders, strange and interesting melting points result. Equal parts of tin and lead, for instance, which is commonly known as the 50-50 solder, has a melting point of approximately 415 deg. F. It will be noted that this is a melting point even lower than that of tin.

An alloy of 63-per-cent tin and 37-per-cent lead, which is known as the eutectic, or perfect combination, has a melting point of 358 deg. F., almost 100 deg. lower than the melting point of tin. This alloy, unfortunately for general work, is not practical, first of all, on account of the high cost, and secondly, it flows at too a low a temperature for most purposes. This alloy has, however, good tensile strength.

All soft solders start to melt at the same temperature, namely 358 deg. F. To turn them into a complete liquid, however, requires a greater amount of heat in accordance with the lead content. It makes no difference whether soft solders in various alloys are made in wire, bar, ingot, or even a cored-

solder form — they all have the same characteristics.

Fusible solders are generally of low melting points. They are made of various combinations of tin, lead, bismuth, and cadmium. Some of these alloys melt at as low as 120 deg. F. One important use of this type of solder is in automatic sprinkling systems for fire protection.

New Publications

Fundamentals of Electricity

By Charles F. Petersen. Paper, 112 pages, 8¼ by 10¾, illustrated. Price, 96 cents. Published by The Bruce Publishing Company, Milwaukee, Wis.

This book has been written especially for the for the boy of high-school age, contains 43 lessons, 5 demonstrations, and a number of tests. Each lesson states the purpose, gives references to a number of texts, outlines the procedure, gives a general explanation of that which is to be known and that which is to be done, presents a number of questions, and shows how the work can be correlated with the social science, general science, English, and spelling, which the student takes up in other classes. The book is well illustrated and presents the facts about elementary electricity in a concise, interesting, and comprehensive way.

Model Boats for Juniors

By Claude William Horst, M.A. Cloth, 78 pages, 9 by 11¾, illustrated. Price, $2. Published by The Bruce Publishing Company, Milwaukee, Wis.

This books has been written especially for the beginner in model-boat building. It contains specific directions for building models from 8-in. runabouts up to 30-in. power yachts. Full directions are given and every step is well illustrated. The book also contains directions for making a tank for sailing toy boats so that the pleasure of testing out a model's sailing characteristics and capacity may be enjoyed indoors.

Elementary Principles of Diesel-Engine Construction

By William H. Timbie. Cloth, 569 pages, 6 by 8¾, illustrated. Price, $3. Published by John E. Wiley & Sons, Inc., New York City.

This is the third edition of this well-known book. It has been thoroughly revised and brought about electrons and vacuum tubes. As in the former editions of this text, the author has presented facts and theories by simple, direct statements, and by assisting the student to apply the information obtained to real, rather than theoretical, situations.

Personal News

MR. TRYBOM RETIRES

During the month of June, Wayne University of Detroit, Michigan, conferred upon John H. Trybom, Director of Vocational Education of Detroit, the honorary degree of Doctor of Science in Education. During the same month, the Detroit Board of Education accepted Mr. Trybom's petition for retirement, but in doing so, they unanimously voted him the title Director Emeritus of Vocational Education in Detroit. Both of these honors are well deserved. Mr. Trybom's 37½ years of service in the Detroit schools almost encompass the entire history and development of practical-arts instruction.

Mr. Trybom was born in Motala, Sweden, October 1, 1866. After his graduation from the Lin Köping Gymnasium in 1886, he attended the Leipzig Seminar for manual-training teachers at Leipzig, Germany. Then he returned to his home

John H. Trybom

Earl L. Bedell

in Sweden, but soon decided to seek his fortunes in America. He landed at Boston, and secured a position as teacher in the Horace Mann School in 1889. He entered the Sloyd Manual Training School and graduated from that institution in 1891. He then matriculated in Harvard and was graduated from that institution in 1896 with an A.B. degree. By 1898 he had met all the requirements for a master's degree. In 1897 he returned to Europe and made a comprehensive study of the systems of education in England, Germany, and France. In 1899, he was named supervisor of manual training and domestic science of Detroit, although he admitted that he could neither cook nor sew. That same year, he published a textbook *Manual Training — Cardboard Construction*.

During all of his years in office, he has been active in many educational associations. The program which he has established in Detroit will stand as a lasting monument to his outstanding efforts and zeal in the promotion of practical education.

BEDELL TO SUCCEED TRYBOM

Mr. Earl L. Bedell has just been assigned to the position of director of vocational education on the retirement of his erstwhile chief, John H. Trybom, whom he loved, and whose assistant he had been since 1929.

Mr. Bedell was born near Saginaw, Mich., graduated from the State Teachers College, Mt. Pleasant, Mich., and the University of Chicago. He received a B.S. degree from the Detroit City College, now Wayne University, and an M.A. from Battle Creek College. He began as a manual-training teacher in Detroit, September, 1913, was promoted to head of the high-school department, Detroit, in 1918. In 1920, he was appointed as supervisor of vocational education in Detroit, and in 1929 was made assistant director in charge of vocational education. He served in that capacity until his present appointment as director.

He has taken an active part in many educational associations whose purposes it is to improve industrial arts and vocational education. He was past president of the Michigan Industrial Education Society in 1932, and is a life member of the Detroit School Masters Club. He is a member of the National Committee on the Objectives of Industrial Arts and of the National Committee for the Development of the Future Craftsmen of America. He also is an active member in the American Vocational Association, National Education Association, Michigan Education Association, and of Epsilon Pi Tau. He is widely known for his many contributions to the professional literature in his field of education.

A second well-deserved honor came to Mr. Bedell when he was elected president of the department of vocational education of the National Education Association at the recent convention held in Detroit.

MR. H. H. BRAUCHER RETIRES

Mr. Herbert Hill Braucher has retired from active service at the University of Illinois, where he was for many years connected with the department of industrial education.

Mr. Braucher was born at Lincoln, Ill., on February 1, 1869, where he attended the Lincoln High School and the Lincoln Business College. In 1894, he obtained his B.S. degree from the University of Illinois. He attended the Stout Institute and the University of Wisconsin. For 15 years, he was professor of manual training at the Kansas State Normal School, Emporia, Kans. He was twice chairman of the manual training section, Kansas State Teachers Association, and for 16 years was instructor and associate in industrial education, at the University of Illinois. He was also a high-school science teacher for 8 years.

Mr. Braucher was a frequent contributor to professional magazines. He was a member of the American Vocational Association, National Education Association, and the Illinois Vocational Association.

At present, Mr. Braucher is the summer counselor in charge of buildings and grounds at the Lake Hubert Camps, Lake Hubert, Minnesota.

¶ Mr. Walter A. Klehm, Head of Department of Education, State Teachers College, Kearney, Nebr., received the degree of doctor of education from the University of Missouri, on June 9. The title of his dissertation was, "A Method of Determining Equipment Requirements in Industrial Arts Based Upon Teaching Objectives."

¶ Mr. Isaac Snell, of Hancock, Mich., has been appointed industrial-arts supervisor in the South Lake High School, at St. Clair Shores, Mich.

¶ Dr. M. Keith Humble, formerly of the University of Missouri, has been appointed a member of the industrial-education staff of the University of Illinois. Dr. Humble will have charge of the teachers' courses in general shop and woodworking.

¶ Mr. Frank Di Giacomo, formerly instructor of printing at the Stuart Junior High School, Washington, D. C., has recently been appointed to the David Boody Junior High School, Brooklyn, N. Y.

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No. 1006—Has a "Stanleoid" composition handle, toughest non-metallic substanceknown. Will not absorb oil or water. Supplied in 4", 6", 8", 12" sizes. The best screw driver for automotive, machine and electrical shops.

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Association News

MASSACHUSETTS INDUSTRIAL EDUCATION SOCIETY MEETS

On June 12, the Massachusetts Industrial Education Society held its election of officers at the annual outing with the Rhode Island Society at North Scituate, Rhode Island.

The following officers were elected: Herman Pohlman, president; Edward Terrenzi, vice-president; Gustave Larson, treasurer; D. J. Sullivan, secretary; A. I. Dodge, librarian.

Appreciation was expressed for the work done by the retiring officers, and best wishes were extended to the incoming officers.—*A. Irving Dodge.*

EPSILON PI TAU INSTALLATION

The sixteenth chapter of Epsilon Pi Tau, was installed on Saturday, May 29, in the State Teachers College, at Cedar Falls, Iowa, amid impressive ceremonies. It will be known as the Pi Chapter. The initiation was in charge of Professor Orville E. Sink, Chairman of the Industrial Arts Department in the Ball State Teachers College at Muncie, Ind.

Chapter group at Cedar Falls, Iowa. Reading left to right: Professor Harold G. Palmer, sponsor; Hugh P. Buffum, vice-president; Professor Chas. H. Bailey; Merle O. Wiener, president; John O. Mecklenburg; Glenn J. Smoha; Walter E. Ditzler, secretary-treasurer, Loel C. Ferguson; Durwood D. Miller; Vern O. Harper; Professor Nathaniel O. Schneider

Dr. Lawrence F. Ashley presided at the banquet as toastmaster. Following the welcome by Dr. O. R. Latham, President of the State Teachers College at Cedar Falls, the guests were introduced by Professor Charles H. Bailey, Chairman of the Department of Industrial Arts in the State Teachers College at Cedar Falls. The initiating team was introduced by Kenneth G. Brown, who was in charge of the Ohio industrial-arts developmental program for small schools at Grove City.

An informal symposium followed on "The Nature and Extent of Industrial Arts in the Program of General Education," which was participated in by national officers, chapter sponsors, laureate members, and the guests.

The charter was then presented by Dr. William E. Warner, serving as installing officer. The response for Pi Chapter was made by the president-elect, Mr. Merle O. Wiener. Professor Harold G. Palmer, faculty sponsor of the new chapter, then presented the keys, following which the student response was made by the vice-president-elect, Mr. Hugh P. Buffum.

A reception followed the banquet in the lounge of the Commons of the College.

Those initiated were: Professor Harold G. Palmer, sponsor; Professor Charles H. Bailey; Professor Nathaniel O. Schneider; Mr. Merle O. Wiener, president; Mr. Hugh P. Buffum, vice-president; Mr. Walter E. Ditzler, secretary-treasurer; A. J. Bielefeldt, James H. Brolliar, Clark H. Brown, D. M. Burkhiser, M. R. Clark, Frank M. Everhart, Loel C. Ferguson, George A. Hansuld, Vern O. Harper, Elliott Hutton, Ellis A. Juhl, Leslie L. McCreedy, Roy McLain, John O. Mecklenburg, Milton Mueler, Durwood D. Miller, Francis S. Orr, Delmar Risse, F. A. Robinson, Erwin Smith, Glenn J. Smoha, B. L. Woodcock.

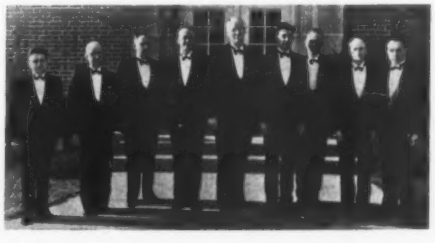
With the installation of Pi Chapter of Epsilon Pi Tau, the membership of the national organization passed the thousand mark. There are now 1,020 members of the Fraternity living in forty-one states.

ANNUAL SPRING CONFERENCE OF INDUSTRIAL-ARTS TEACHERS

The annual spring conference of industrial-arts teachers of New York State was held on March 9 and 10, in the State Normal School, Oswego, N. Y.

At the general assembly, Dr. F. T. Struck, of

(Continued on page 7A)



Initiating team of states. Reading left to right: Glenn E. Best, Mongomery, W. Va.; Clyde A. Bowman, Menomonie, Wis.; Lawrence F. Ashley, Charleston, Ill.; William E. Warner, Columbus, Ohio; Orville E. Sink, Muncie, Ind.; Louis J. Callan, Webster, N. Y.; R. L. Schwanzle, Emporia, Kans.; Homer J. Smith, Minneapolis, Minn.; Everett G. Livingston, Ames, Iowa

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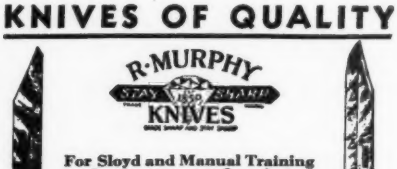

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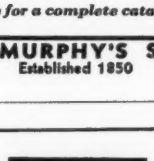

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Sheets—18"x24"—12-14-15-16-18 ga.
Square Wires—⅛"-$\frac{3}{16}$"-¼"-$\frac{5}{16}$" approx. sizes
Tubing—$\frac{3}{16}$"-¼"-⅜"-½"—all inside dia.
Rods—⅛"-$\frac{3}{16}$"-¼"-⅜"—approx. dia.
Hinges—1" and ⅝"
Slugs—1¼"-1"-⅞"-¾"—dia. (in any thickness)
Pewter Solder—70/30—12 ga. round
65/35—Half Round
60/40—flat jewelers strip

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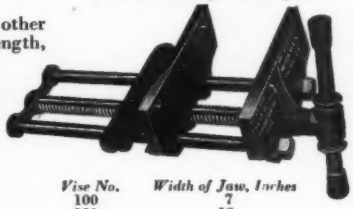

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(Continued from page 5A)

the Pennsylvania State College, State College, Pa., gave a talk on "The Social-Economic Philosophy of Industrial Arts." At the first session, the topic was "Problems of the New Teacher in a One-Teacher Shop," with Mr. Arthur Hauler in charge. The principal speaker was Mr. Roy G. Fales, Albany, N. Y., who discussed equipment and shop layout. The second meeting dealt with "Present Trends of Industrial-Arts Education," and was in charge of Mr. E. E. Raymond. Other topics were: "Industrial Arts in Elementary Grades"; "Industrial Arts in the Junior and Senior High School"; "Diversified Occupations Organization in Senior High Schools."

The second day was devoted to a conference of superintendents, directors, supervisors, and principals, associated with co-operating centers in the off-campus student-teaching program.

The third general meeting dealt with the problem of selectivity in the training of industrial-arts teachers, with Dr. Ralph W. Swetman in charge. Mr. E. D. Fink, of Albany, discussed student-teaching in off-campus centers from the point of view of the student-teacher, the master-teacher, and the state department of education.

The topic of the fourth general meeting was industrial-arts student-teaching in the off-campus centers, with Mr. Arthur Hauler as chairman. Among the topics discussed were student-teacher responsibility, master-teacher responsibility, normal-school responsibility, supervision of student-teaching by master teachers, and trends of science in junior and senior high schools.

CENTRAL CONNECTICUT ASSOCIATION MEETS IN NEWINGTON

The Central Connecticut Industrial-Arts Association held its summer meeting on May 19, in the high school at Newington. Forty members were present to enjoy the program arranged by Mr. A. M. Anderson and the program committee.

Following an enjoyable musical program, the group listened to a talk by Mr. Clinton B. Ripley, who spoke on his archeological explorations. He spoke of the work in New Mexico and declared that there is nothing comparable to excavating as a hobby.

Mr. Rich presented a brief report on the plans for the boat meet, and Mr. Barker talked on the program of the Hartford County Teachers' Association. Plans were discussed for credits in industrial-arts work next year. — *H. A. Barnicle.*

CONNECTICUT INDUSTRIAL-ARTS ASSOCIATION MEETS IN NEW BRITAIN

The annual two-day conference of the Connecticut Industrial-Arts Association was held on April 30, in the State Teachers' College in New Haven. President Walter F. McAndrews presided at the meeting.

Dr. E. W. Butterfield spoke of a changed society and of the importance of industrial arts in this age of machines. Mr. E. W. Bollinger, of New York City, spoke on "New Fundamentals in Industrial Arts," in which the criteria for judging the value of industrial arts was splendidly illustrated. Mr. John W. Higgins, of Worcester, Mass., in a talk on "Schools and Careers," stressed the importance of industrial-arts education and pointed to the small amount of money given to the support of this subject.

Following the addresses, the group went to the reception room of the college where they enjoyed refreshments and engaged in informal chats. Later the group visited the commercial exhibits.

On Saturday, the Epsilon Pi Tau held a breakfast meeting to which all members were invited. President McAndrews presided and addresses were given by John A. Backus, John W. Higgins, E. W. Bollinger, Raymond Phipps, and R. O. Fales. Mr. Roy O. Fales, who spoke on "Industrial-Arts Development in New York State," traced the expansion of the work and pointed to the changed and broadening view of industrial arts in the general educational program.

A number of panel discussion groups were arranged, taking up industrial arts in elementary schools, in junior high schools, and in senior high schools.

Following the noon lunch in the college dining room, the group listened to a talk on "Research in Industrial-arts Fundamentals," by Prof. L. L. Gore, of Peabody College, Nashville, Tenn. He spoke on the research work done in mechanical drawing.

President McAndrews introduced the commercial exhibitors to the Association and urged that more time be given to the visiting commercial exhibits in the future. The officers of the New England Association in attendance were also introduced. The following officers were elected for the next year:

President, Frank S. Whitman, Bridgeport; first vice-president, Harry A. Barnicle, Hartford; second vice-president, Fred Martin, Bridgeport; third vice-president, Edwin Harris, New Haven; secretary, Henry F. Rockel, Bridgeport; treasurer, John H. Iles, Bristol. — *H. A. Barnicle.*

MOHAWK VALLEY CLUB MEETS IN OSWEGO NORMAL SCHOOL

The members of the Mohawk Valley Industrial-Arts Club held their meeting on May 14, in the State Normal School at Oswego, N. Y.

The group visited the various shops and departments of the school during the morning session. Following the lunch in the school cafeteria, the members listened to short talks by Dr. Selmer Larson and Dr. Joseph C. Park.

In the afternoon the group continued their

(Continued on page 8A)

(Continued from page 7A)

visits in the industrial-arts building. The program was concluded with a dinner at the DuBois Inn, at Minetto, to which the normal school faculty were invited. Mr. Gordon Wilber was in charge of the program. — *Joseph C. Park.*

EPSILON PI TAU INITIATION MEETING

The Zeta Chapter of Epsilon Pi Tau of Northern Illinois State Teachers College, DeKalb, Ill., had an initiation meeting at Armour Institute of Technology, Chicago, Ill., on May 22, 1937. The faculty sponsor of this chapter is Professor Paul E. Harrison. The initiates were: Professor Russell J. Greenly, Purdue University, Lafayette, Ind.; Mr. Dunbahn, Highland Park High School, Highland Park, Ill.; Mr. Lester Smith, University of Chicago High School, Chicago, Ill.; Mr. Emil Danovsky, Northern Illinois State Teachers College, DeKalb, Ill.; Mr. John Clark, Northern Illinois State Teachers College, DeKalb, Ill.

At the banquet which followed, Dr. Lewis V. Newkirk, Director Industrial Arts and Elementary Science of the Chicago City Schools was toastmaster. Professor Russell J. Greenly delivered the main address on current problems in trade and industrial education. He traced the history of education in America from its beginning and showed that the work of the high school has gradually changed from one of preparing a few for college entrance to the task of preparing a great many for direct entrance into life. He showed the extreme need for better organization of vocational courses, for the better preparation of qualified instructors, for better and more adaptable vocational course for adults, for closer contact between industry, labor, and the school in outlining the vocational curriculums, for a more intimate study of the objectives of such movements as the Future Craftsmen of America, diversified occupations programs, and the CCC programs. He also urged that standards of supervision be formulated and that courses be prepared for training women in job competency, culture, and domesticity.

WESTERN WASHINGTON TEACHERS MEET

The industrial-education teachers of Western Washington met in Mt. Vernon, on May 8. A splendid program was carried out, including talks by Mr. J. A. Reeves, superintendent of schools of Mt. Vernon; Mr. J. G. Sinclair, principal of the Vancouver Technical School, Vancouver, B. C.; and a panel discussion led by Prof. U. G. Whiffen, of the Washington State College in Pullman.

The meeting was concluded with a salmon bake luncheon, served at the Reservation Bay on Deception Pass. More than one hundred teachers were in attendance. Mr. Dana R. Lincoln, of Mt. Vernon acted as chairman of the meeting.

The annual summer conference for industrial-arts and industrial-education teachers of Washington will be held at Anacortes, August 16 to 20 inclusive. Teachers from other states, who may be in the Pacific Northwest, are invited to attend the sessions. Arrangements have been made whereby credit may be earned through attendance. — *A. H. Drews.*

SPRING CONFERENCE OF MISSOURI TEACHERS

The annual spring conference of the Missouri teachers of vocational and industrial education was held May 14 and 15, in Columbia. The meeting was divided into groups of the discussion panel type, with instructors of the state as panel members.

Among the guest speakers at the meeting were Mr. Homer J. Smith, professor of industrial education at the University of Missouri; Mr. Laurence Parker, of Pittsburg; Mr. E. E. Gunn, of Madison, Wis.; and Mr. N. B. Giles, regional agent for the Office of Education, Washington, D. C.

The outstanding meeting of the conference was that devoted to the revision of the course of study for the state. The main topic was "What Shall We Teach?" Dr. R. W. Selvidge, of the University of Missouri, spoke on "Qualifications of the Teacher"; Mr. G. H. Hargitt, of St. Louis, discussed "The Subject Matter for Industrial-Arts Courses"; and Mr. V. L. Pickens, Kansas City, talked on "Manipulative Skills vs. Related Information."

The conference discussed the suggestion advanced by industrial-arts teachers that the industrial-arts schools offer a different type of instruction toward the master's degree in industrial arts. The purpose of the instruction is to provide more able teachers for this type of work and to offer credit toward the master's degree. — *J. Ernest Kuehner.*

NORTHERN KENTUCKY INDUSTRIAL-ARTS ASSOCIATION MEETS

The Northern Kentucky Industrial-Arts Association held its annual meeting on Saturday, May 1, in the Highlands High School, Fort Thomas, Ky. Mr. John A. Whitesel, president of the Association, presided, and Mr. J. W. Austin, Fort Thomas, gave the address of welcome.

The meeting was opened by John A. Whitesel. Dr. W. E. Warner, of Ohio State University, then gave an address on "Industrial Arts: Its Antecedents and Program." Mr. Elmer W. Christy, of Cincinnati, directed a panel discussion on the topic, "What I See for Industrial Arts in My School." Six superintendents of city and county schools participated. The meeting adjourned to give the visitors an opportunity to visit the various industrial-arts centers and the laboratory of industries in the Norwood High School.

NORTHEASTERN OHIO TEACHERS MEET

The second annual spring meeting of the Northeastern Ohio Industrial-Arts Teachers was held on May 8, in the Kent State University, Kent, Ohio. Two hundred and fifty teachers were in attendance.

The topic for discussion at the meeting was "Industrial Arts in Modern Education." The meeting was divided into rural and city schools, with a chairman in charge of each section. At the rural session, Oren Casey, Mentor, talked on "General Metalwork"; J. P. Henley, Cleveland, discussed "General Electricity"; Merel Leggett, Medine County, led the general discussion.

At the city-schools session, Mr. L. J. Smith was in charge. W. A. Walls, Kent, talked on "Social Adjustment Through Industrial-Arts Teaching"; J. Dunn, Cleveland, discussed "General Drawing"; and J. C. Straub, Cleveland, took for his subject "Modern Trends in Wood and Metal Finishing." A general discussion followed. There were a number of demonstrations, including a flying demonstration of model airplanes. An extensive exhibit was on display.

The officers elected for the year 1937–38 are: President, Carl H. Hamburger, Cleveland; vice-president, Merle Leggett, Medina; secretary-treasurer, E. W. Tischendorf, Kent.

A brief business session was held at which time the chairman appointed a committee of five persons to prepare a constitution and by-laws for the organization, these to be presented at the fall meeting, which is held in connection with the Northeastern Ohio Teachers Association in Cleveland. The members of the committee are: E. R. Bumgarner, Chairman, Akron; Oscar Schneider, West Technical High School, Cleveland; Mr. Bartee, Brodhead Garrett Co., Cleveland; A. J. Spangler, Kent; and Howard Selch, Cuyahoga Falls. — *E. W. Tischendorf.*

News Notes

Board Discontinues Aviation Training

The board of education at West Hartford, Conn., has discontinued experiments with powered airplanes by aviation clubs in the schools. The action of the board will bar junior-high-school students from operating small planes.

Miami to Have Trade School

The Dade County school board in Miami, Fla., has proposed the establishment of a county trade and industrial school. Supt. J. T. Wilson has been ordered to prepare a list of courses, plans for instruction, equipment, and required personnel.

New Vocational Shop in Pittsfield, Massachusetts

A machine shop has been installed in the vocational department of the high school at Pittsfield, Mass. The equipment, valued at $22,000, cost the city only $3,000, as local concerns donated machines and various items of equipment. The shop takes care of 30 students, who are given instruction and who will be awarded diplomas upon completion of their courses.

Foremanship Training Conference

Wayne University, in Detroit, Mich., recently conducted a foremanship training conference, under the direction of Robert L. Howard. Under the plan, foremen in Detroit industrial plants were divided into groups and met in the plants and in the Wayne University buildings, where they discussed problems on production, security, shop relationships, and similar matters. More than a dozen Detroit industrial concerns were active in promoting and assisting the conference.

Trade School Follow-up

Vocational schools should follow up their graduates by remaining responsible for their welfare in the years following graduation, according to Dr. Franklin J. Keller, of the Metropolitan Vocational High School, in New York City. Speaking at the University of Colorado's twenty-fifth school and college conference, in Boulder, he stressed the fact that the adjustment among school, society, and individual becomes apparent when the vocational student leaves his school to enter industry. He maintained that the school must keep its finger on the pulse of the economic organism and when it becomes sick report to those other public servants who are responsible for economic health.

Bethlehem Steel Course for College and University Graduates

The Bethlehem Steel Co., of Bethlehem, Pa., has issued a booklet, describing its training course for college and university graduates. The course is being offered in response to a demand for college-trained men. The purpose of the course is to so train these young men that they may be able to take over new positions and responsibilities in the company.

The broad field of the Bethlehem Steel Company offers a wide choice of life careers to all who accept employment in its organization. It comprises seven large iron and steel plants in the east, and three on the Pacific Coast.

It is apparent that apprenticeship forms the chief opportunity for youth in manufacturing industry. Few employers want to hire young people who have not at least finished high school. The employer believes that youth should continue education as long as possible, both in day school before getting a job, and at night school after work is obtained.

There is need of increased facilities for training machinists and toolmakers in the trade and technical schools, as well as in the academic high

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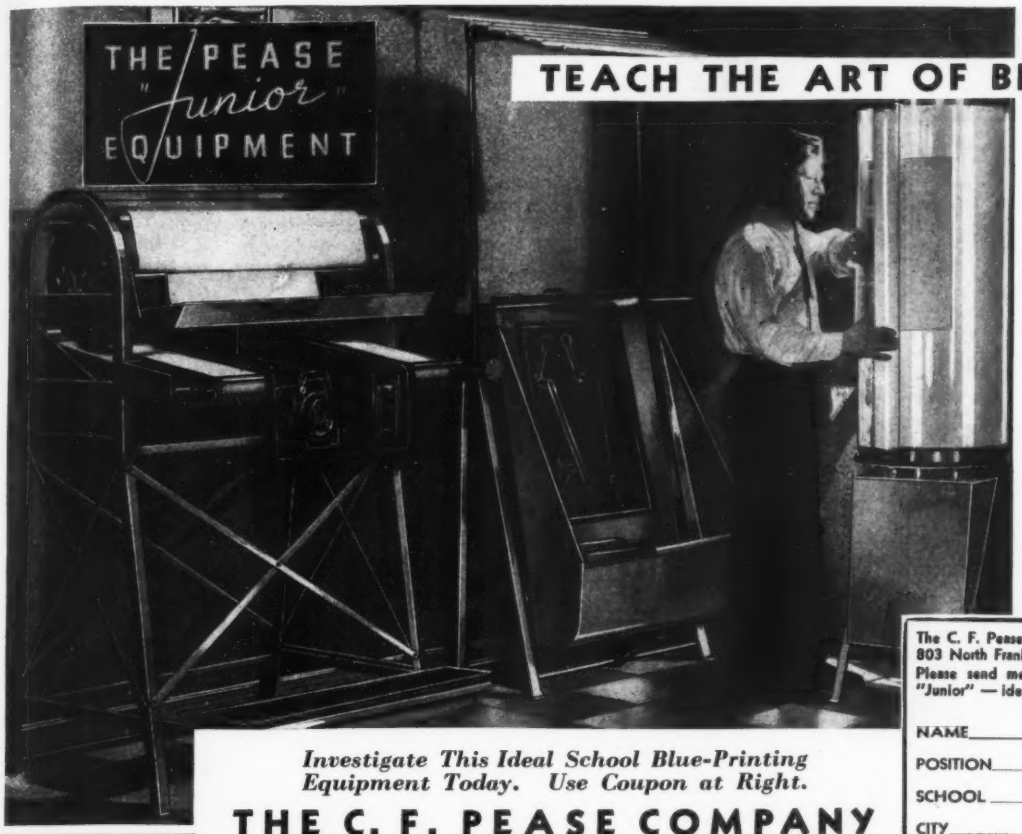

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(Continued from page 8A)

schools, in order to satisfy at least 50 per cent of the demand of these trades in the city.

Survey of Employment Situation

In Milwaukee, the mayor's youth committee of one hundred recently undertook a survey of the employment situation in Milwaukee County as it affects the city's youth. A subcommittee, of which Dean F. A. Kartak, of the College of Engineering, Marquette University, was chairman, made a study of twenty-five industries, employing almost 8,000 young persons. The purpose of the survey was to discover what opportunities existed for employment and what qualifications employers were demanding of workers. The report brought out that the larger industries cannot be depended upon to absorb all the unemployed youth of Milwaukee County. In fact, at best, it is found that the industries of the community can employ only a portion of such youth. For full absorption of youth into employment, it is necessary to look also to retail and general service industries.

Establish High-School Air Cadet Corps

The high school in Helena, Mont., is the first high school in the country to establish and maintain a flying air cadet corps made up solely of qualified high-school aviation students. The air cadet corps was established through the efforts of Principal W. W. Wahl of the high school and L. W. Fahrner, instructor in aeronautics. The class has a membership of 20, all fully accredited in high-school grades. The class is governed by strict regulations and each student must pass a rigid physical examination. Each student must have finished one successful year of aeronautics and at least ten hours' instruction in the air before making a solo flight. Cadet company inspection, flight exhibitions, and other entertainment are given at various times, with the public invited to see the progress made by the boys.

Helena High-School Air Cadet Corps

Syracuse University Revises Curriculum

The School of Education of Syracuse University, Syracuse, N. Y., has completely revised its curriculum for the training of teachers. The new program, adopted after two years' study by the curriculum committee of the University, is designed to meet changes in emphasis involving both child development and subject matter.

The new program calls for complete integration of educational theory with a wide variety of practice throughout the two years of preparation required by the School of Education. Problems of curriculum administration and instruction will be taken up through continuous observation and experience in school and community. An effort is made to close the gaps between theory and practice through appropriate lectures, seminars, and field projects. The student enrolling in this course is expected to do additional reading, research, and study.

It is planned to place the new course in operation during the next year.

Eau Claire Vocational School

The vocational school in Eau Claire, Wis., has moved into new quarters, which allows the school to expand and develop. The quarters will be in the sixth-ward school, which provides space for a general shop, a shop lecture room, a classroom for adult-education groups, an assembly hall, a recreation room for students, a general-subjects room, a school library, a home-economics suite, a commercial department, and offices for the faculty.

Metal Industries Laboratory at Alvin, Texas

The school board of Alvin, Tex., has voted to spend $15,000 in equipping a laboratory for the teaching of metalwork. The new department will be opened in September, 1937.

Increased Structures and Equipment Needed

Experts in vocational education in Detroit, Mich., have pointed to the immediate need for increased facilities for technical and vocational training in the city. The local board of education is asking for $6,400,000 for new buildings in its budget for the school year 1937–38. Each of the technical and vocational schools is badly in need of increased space, and new additions or quarters are necessary for the two girls' schools, the George Junior Trades School and the Building Trades School. The Wilbur Wright High School and the Cass Technical High School are also badly overcrowded and in need of relief.

School-Shop Equipment News

NEW EDITION OF MACHINISTS' MANUAL

The 33rd edition of "How to Run a Lathe" has recently been announced by the South Bend Lathe Works, South Bend, Ind. It has 160 pages containing the latest and most authoritative information about the fundamental operations of modern lathe practice. Instructions are given in

(Continued on page 11A)

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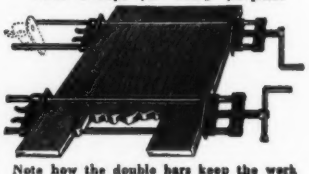

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(Continued from page 9A)

detail and there are more than 300 illustrations. The book also contains reference tables and formulas, tables of cutting speeds of metals, application of lathe tools, cutting screw threads, metric screw threads, taper turning and boring, milling and keyway cutting, bushing work, gear cutting, proper application and types of drives, shop hints and short cuts, and the like.

Copies are obtainable at 25 cents each, postpaid, from the South Bend Lathe Works, South Bend, Ind.

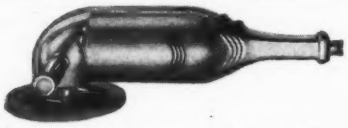
INTERESTING FACTS ABOUT SOLDERS

Mr. James C. Shaw of the Gardiner Metal Company, Chicago, Ill., has prepared a brief news article on interesting facts about Gardiner solders which appears on page 261 of this issue.

SKILSAW ANNOUNCES TWO DISC SANDERS

Skilsaw, Inc., of Chicago, Ill., has announced an addition of two new tools to its line of well-known Skilsaw portable electric tools.

The two new models of Skilsaw 7-in. disc sanders — one for heavy duty, and the other for constant production service — are intended for work upon irregular surfaces and will be found valuable in the school shop. In appearance, con-



struction, and performance efficiency, these new disc sanders combine everything that is new in fine portable tool manufacture. The smooth, trim design, the perfect balance, the lighter weight, and the comfortable grip handles make them very efficient in use. The ventilating ports are so located that the dust is blow away from the operator and to prevent clogging. The motor has ample reserve power to insure long life, and the ball bearings are placed in positions where they are fully sealed as a protection against dust and leakage of grease.

Skilsaw sanders are used by industry for removing weld marks, rust and dirt from tanks or vats, and for finishing tile, concrete, stone, and marble surfaces. It will find equally many uses in the school and school shop. They are made in a variety of sizes and weights and sell at very moderate prices.

Complete information is available upon request.

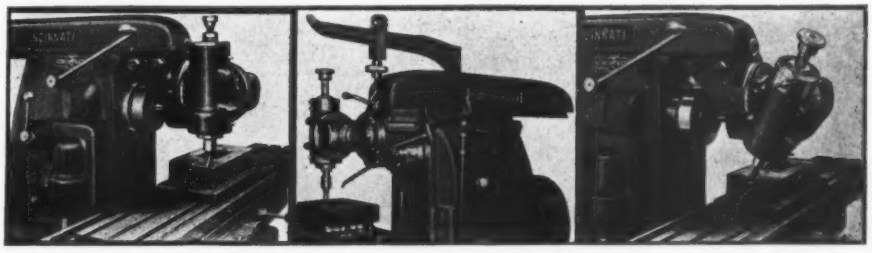
ANNOUNCE HIGH-SPEED UNIVERSAL MILLING ATTACHMENT

A new high-speed universal milling attachment, in sizes to fit three types of milling machines, has recently been announced by the Cincinnati Milling Machine and Cincinnati Grinders, Inc., of Cincinnati, Ohio.

This new high-speed attachment may be swiveled 360 deg. in a plane parallel with and 90 deg. in a plane at right angles to the face of the column. Graduations around the circumference of the housings allow accurate setting of the cutter to any desired angle. Four clamping bolts in each swiveling element hold the spindle firmly in the desired position.

The attachment is driven directly from the machine spindle by means of a splined shaft fitted into an adapter. This adapter is driven by the arbor driving keys and centers from the spindle. The overarm is generously proportioned, and constitutes the supporting element for the attachment. Gears and shafts are of heat-treated alloy steel, and the drive is supported on anti-friction bearings throughout.

This attachment is specially useful in the toolroom and is helpful in light work requiring the use of small milling cutters, drills, and boring tools. The illustrations show the standard attachment, together with the quill-feeding mechanism, crane, and quick-change adapter not included with the standard attachment.



Left: The standard attachment. Center: The crane attachment. Right: Attachment with a hand quill-feed device and quick-change adapter, swiveled for an angular cut

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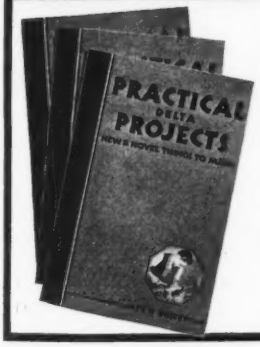

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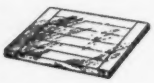

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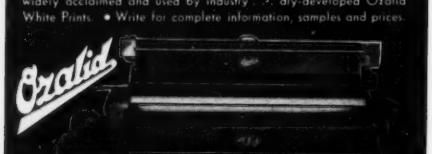

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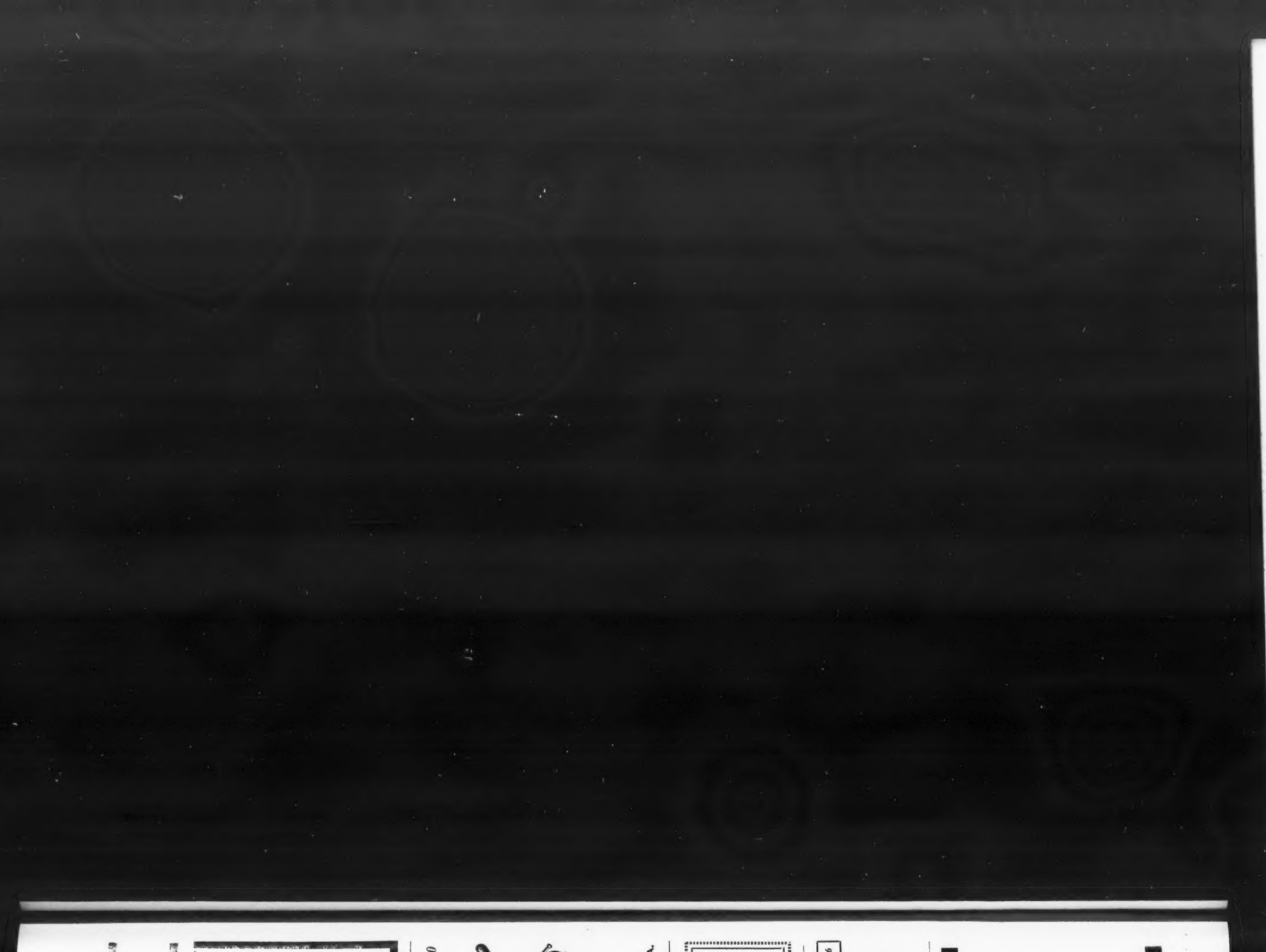
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